

2014

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High Technology Training System

Man&tel Man & Tel Co., Ltd.

Man & Tel Co., Ltd is a venture-enterprise company developing high Technology Training System and communication terminals.



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Man & Tel is an INNO-BIZ company and venture-enterprise which develop high-tech educational systems and medical devices and equipment for rehabilitation

to education of commercialization
education.

Man & Tel will continue to make every effort to be a company beneficial to the society and move ahead with innovative and challenging spirit along with flexible mind and utmost efforts in the IT-convergence market which will lead the future.

Thank you

K.W. Jung

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A group of RF Design / Antenna / Microwave Training System

RFDT-1000 / MW-1000 / MW-2000 / MW-5000

MATS-1000 / WATS-2002

These equipments provide trainees with chance to design, manufacture and measure microwave communication system by applying microwave designing theory. Also, experiments on standing wave, fading, wave loss, doppler effect are provided to help trainees understand characteristics and radio patterns of various antennas in addition to wave features in mobile communication.

RF Signal Generator



RFSG-1000

Wave and antenna
Training System



WATS-2002

Antenna
Training System



MATS-1000

microwave communication
Trainer



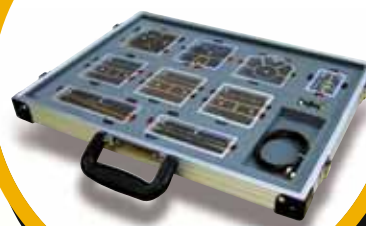
MW-2000 / MW-5000

RF Design
Technology Trainer



RFDT-1000

Microwave
Experiment Kit



MW-1000

RF Design Technology Trainer

Model: RFDT-1000



RFDT-1000 Features

1. Helps users acquire basic RF circuit designing skills.
2. Helps users acquire RF module manufacturing skills.
3. Provides RF circuit measuring practices.
4. Provides chip components' value measuring practices in high frequency band.

RFDT-1000 helps users understand basic and important techniques of RF circuit design through theories, manufacturing practices and measuring practices.

RFDT-1000 Functions

- 1) Understanding port extension skill.
- 2) Understanding how to measure chip impedance and changes of the impedance.
- 3) Understanding principle of microstrip stub and impedance calculation.
- 4) Understanding RF choke design and characteristic measurement.
- 5) Impedance matching : L,C matching converter, Stub matching, L,C Matching in transmission line.
- 6) LC filter1 : Understanding types and operation of low pass filter, Implementing them on microstrip lines and measuring characteristic values.
- 7) LC filter2: Designing&manufacturing band pass filter and understand its characteristics.
- 8) Designing, manufacturing and tuning monopole antenna.
- 9) Designing microstrip patch antenna and understanding power feed.

RFDT-1000 Training contents

- Chapter 1. Port Extension
- Chapter 2. Measuring Chip Impedance
- Chapter 3. Microstrip stub
- Chapter 4. RF choke
- Chapter 5. Impedance Matching 1
(using lumped element L, C)
- Chapter 6. Impedance matching 2
(using a converter)
- Chapter 7. Impedance matching 3
(using stub matching)
- Chapter 8. Impedance matching 4 (using L and C loaded on transmission line)
- Chapter 9. LC low pass filter
- Chapter 10. LC bandpass filter
- Chapter 11. Monopole Antenna
- Chapter 12. Microstrip Monopole Antenna
- Chapter 13. Microstrip Patch Antenna 1
- Chapter 14. Microstrip Patch Antenna 2
- Chapter 15. Microstrip Patch Antenna 3

RFDT-1000 Specifications

Items	Specifications
Frequency Band	20[Mhz] ~ 3[GHz]
Impedance	50[Ω]
Substrate material	FR-4
PCB thickness	0.8[mm]
Dielectric constant	4.4
Operating Temperature	-20 ~ 50
Relative Humidity	0% ~95%

RFDT-1000 Components

Items	Spec	Q ty
The finished PBA		52 types
Practice and manufacturing RF PCB		56 ea
Chip component (R,L,C)	46 kinds	2,300ea (46kinds x 50ea)
Cooper tape	A4	1 ea
Enameled wire	10MT	1 roll
RF Cable		2 ea
Textbook		1 book
Carrying bag		1 ea
Chip components measuring JIG		1 set

Microwave Communication Trainer

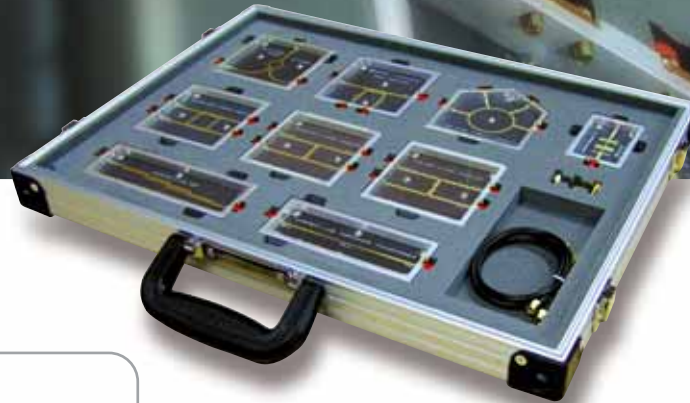
Model: MW-1000/ MW-2000 / MW-5000

An experimental equipment to educate Microwave Component Design, Manufacturing, and Measuring techniques include Microstrip line theory and Microwave device design theory.



Microwave Experiment Kit

Model: MW-1000



MW-1000 Function

- 1) Study the microstrip line design theory
- 2) Study the basic theory of microwave component
- 3) Microwave component design & simulation
- 4) Microwave component manufacturing
- 5) Microwave component measurement
- 6) Microwave component analysis of characteristics

MW-1000 Characteristics

Experiment in Microwave component design and Manufacturing & Measurement using microstrip line theory.

An Experimental Kit to educate basic concept of Microstrip Line Design and Microwave Component Design.



* Equipments are option.

MW-1000 Specifications

Items	Specifications
Frequency	2.0 [GHz] , 2.4 [GHz]
Input Impedance	50 [ohm]
Connecting Loss	0.3 [dB]
Substrate material	Teflon
PCB thickness	0.787 [mm]
Dielectric Constant	2.5

Components

Main Components	9 EA
Carriage bag	1 EA
Textbook	1 EA
Connector	2 EA
50ohm terminator	2 EA
Answer Sheet	1 EA

MW-1000 Training Contents

Part I Introduction

Chapter 1 Microwave Experiment Kit Overview

Part II Experiment of the Microwave passive Component

Chapter 2 Tapered Line Impedance Transformer

Chapter 3 Wilkinson Power Divider

Chapter 4 Quadrature Hybrid Coupler

Chapter 5 Coupled Line Directional Coupler

Chapter 6 Folded Lange Coupler

Chapter 7 Unfolded Lange Coupler

Chapter 8 180° Hybrid

Chapter 9 Stepped Impedance Low Pass Filter

Chapter 10 Coupled Line Band Pass Filter



Microwave Communication Trainer (2.4GHz)

Model: MW-2000



AN 50178251 0001 [March 30, 2010]

MW-2000 Features

Allowing students to train themselves about Experiment in microwave components design and manufacturing & Measurement applying microstrip line theory and microwave device design theory.

For these experiment, standard devices and Specification & documents are supplied with software program as reference.

MW-2000 Functions

- Communication using the Microwave system
- Measurement in Microwave system
- FSK Modulation & Demodulation in Microwave band
- File transfer and data transmission
- Understanding of the microstrip line design theory
- Understanding of the basic theory of microwave devices
- Design and simulation of Microwave devices
- Experiments in manufacturing and measurement of Microwave devices.
- Signal Generator and Spectrum Analyzer can be used for measuring the wave form of all the substrates manufacturing by students.

MW-2000 Specifications

1) General Specification

Frequency band	2.4[GHz] ~ 2.5[GHz]
Modulation	FSK
Bit rate	4800 ~ 14400[bps]
Output power	+ 4.5 [dBm] Max
Impedence	50 [ohm]
Substrate material	Rogers RO4003C
PCB thickness	0.508 [mm]
Dielectric constant	3.38

2) Module Specification

Low Noise Amplifier	Frequency band	2.4~2.5 [GHz]
	Gain	26 [dB]
	Noise Figure	2.5 [dB]
	Input P1dB	-25 [dBm]
Power Divider	Type	2-way, Wilkinson
	Frequency band	2.4~2.5 [GHz]
	Return loss	14 [dB]
	Insertion loss	0.5 [dB]
Band Pass Filter(2.4GHz)	Type	Edge-coupled
	Center Frequency	2.4 [GHz]
	Return loss	10 [dB]
	Insertion loss	7.0 [dB]
Band Pass Filter (2.5GHz)	Type	Edge-coupled
	Center Frequency	2.5 [GHz]
	Return loss	10 [dB]
	Insertion loss	7.0 [dB]
RF Amplifier	Frequency band	2.4~2.5 [GHz]
	Gain	15 [dB]
	Input	-5 [dBm]
	Type	YAGI (PCB type)
Antenna (Transmitting & Receiving)	Center Frequency	2.45 [GHz]
	Gain	9 [dBi]
	VSWR	1.5:1



MW-2000 Application Program

- Communication software : Microwave Communication Program V1.0
- Design Simulator : Ansoft Designer SV

MW-2000 Training Contents

- Chapter 1 Introduction to Microwave Communication Trainer
- Chapter 2 FSK Modulator
- Chapter 3 RF Amplifier
- Chapter 4 Antenna
- Chapter 5 Low Noise Amplifier
- Chapter 6 Power Divider
- Chapter 7 Band Pass Filter
- Chapter 8 Detector
- Chapter 9 FSK Demodulator
- Chapter 10 Microwave Communication Experiments



MW-2000 Components

Device	FSK Modulator	1EA
	FSK Demodulator	1EA
	RF Amplifier	2EA
	Detector	2EA
	Band Pass Filter 2.4GHz	1EA
	Band Pass Filter 2.5GHz	1EA
	Power Divider	1EA
	Low Noise Amplifier	1EA
	Yagi Antenna	2EA
	DC Power Adaptor(1.2V / 1.5A)	2EA
	DC Power Cable	2EA
	RS-232C Cable	2EA
	RF Cable	3EA
	Carriage bag	1EA
	Antenna Cable(75cm)	2EA
	Antenna Supporter	2set
	SMA Adaptor	6EA
	50 ohm Terminator	1EA
	Software program	1EA
	Textbook	1EA
	Answer sheet (Included in CD)	1EA
	Program CD	1EA

Microwave Communication Trainer (5.8GHz)

Model: MW-5000



MW-5000 Features

Allowing students to train themselves in microwave components design and manufacturing & measuring by using Passive and Active devices and program at 5.8GHz. For these experiment, standard devices and specification & documents are supplied with software program as reference.

MW-5000 Specifications

1) General Specification

Frequency band	5.75[GHz] ~ 5.85[GHz]
Modulation	FSK
Bit rate	4800 ~ 14400[bps]
Output power	+ 4.5 [dBm] Max
Impedence	50 [ohm]
Substrate material	TLY-5A-0200-CH/CH
PCB thickness	0.508 [mm]
Dielectric constant	2.17

2) Module Specification

Low Noise Amplifier	Frequency band	5.75~5.85 [GHz]
	Gain	26 [dB]
	Noise Figure	2.5 [dB]
Power Divider	Type	2-way, Wilkinson
	Frequency band	5.7~5.9 [GHz]
	Return loss	14 [dB]
Band Pass Filter(5.7GHz)	Type	Edge-coupled
	Center Frequency	5.7 [GHz]
	Return loss	14 [dB]
	Insertion loss	0.5 [dB]
Band Pass Filter (5.8GHz)	Type	Edge-coupled
	Center Frequency	5.8 [GHz]
	Return loss	10 [dB]
	Insertion loss	0.5 [dB]
RF Amplifier	Frequency band	5.75 ~ 5.85 [GHz]
	Gain	14 ~ 1 [dB]
	Input	-5 [dBm]
Antenna (Transmitting & Receiving)	Type	YAGI (PCB type)
	Center Frequency	5.8 [GHz]
	Gain	9 [dBi]
	VSWR	1.5:1

MW-5000 Functions

- Communication using the Microwave system
- Measurement in Microwave system
- FSK Modulation & Demodulation in Microwave band
- File transfer and data transmission at 5.8GHz
- Understanding of the microstrip line design theory
- Understanding of the basic theory of microwave devices
- Design and simulation of Microwave devices
- Experiments in manufacturing and measurement of Microwave devices.
- Signal Generator and Spectrum Analyzer can be used for measuring the wave form of all the substrates manufacturing by students.

MW-5000 Application Program

- Communication software : Microwave Communication Program V1.0
- Design Simulator : Ansoft Designer SV

MW-5000 Training Contents

- Chapter 1 Introduction of Microwave Communication Trainer
- Chapter 2 FSK Modulator
- Chapter 3 RF Amplifier
- Chapter 4 Antenna
- Chapter 5 Low Noise Amplifier
- Chapter 6 Power Divider
- Chapter 7 Band Pass Filter
- Chapter 8 Detector
- Chapter 9 FSK Demodulator
- Chapter 10 Microwave Communication Experiments

MW-5000 Components

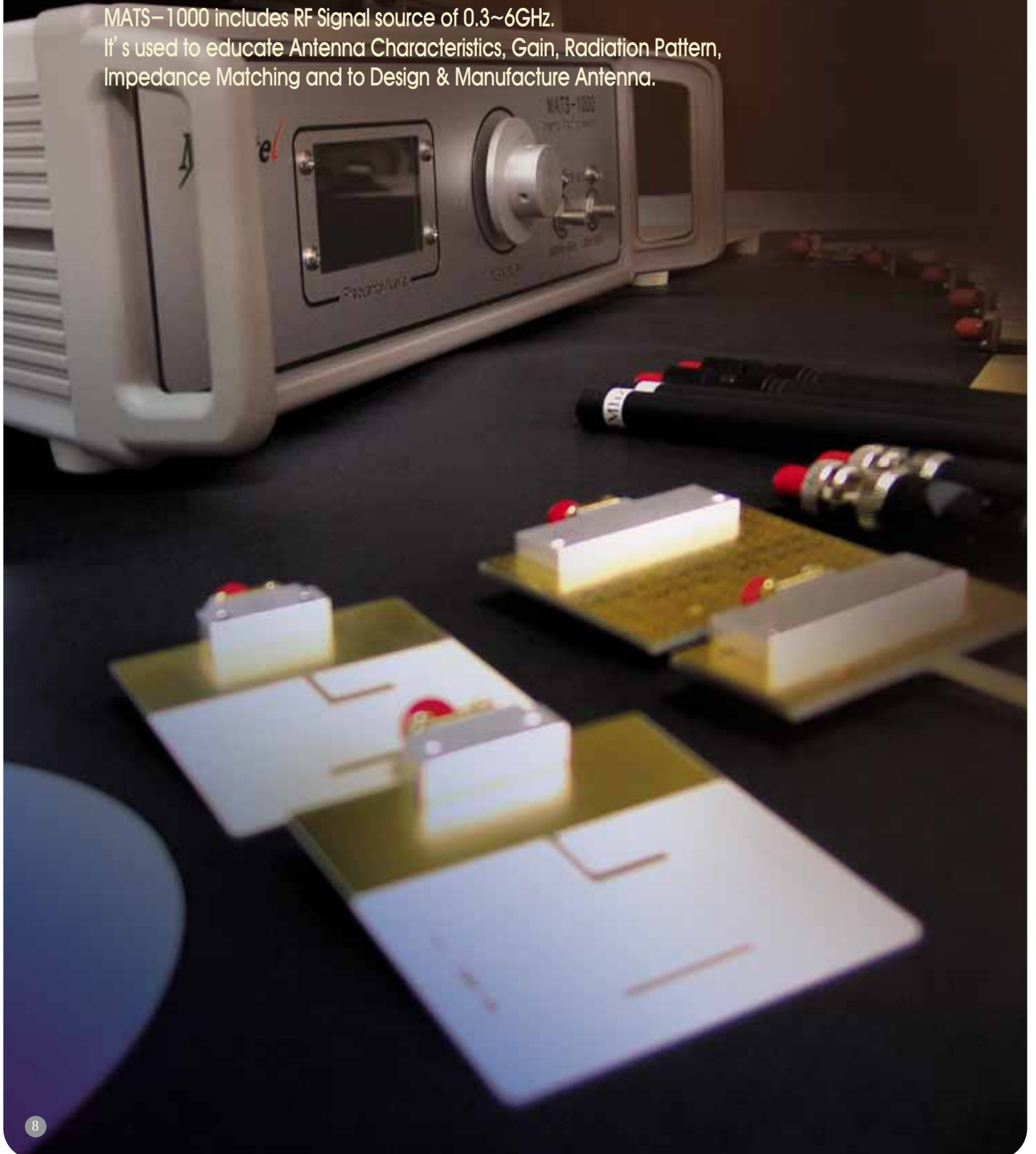
Device	FSK Modulator	1EA
	FSK Demodulator	1EA
	RF Amplifier	3EA
	Detector	2EA
	Band Pass Filter 5.7GHz	1EA
	Band Pass Filter 5.8GHz	1EA
	Power Divider	1EA
	Low Noise Amplifier	1EA
	Yagi Antenna	2EA
	DC Power Adaptor	2EA
	DC Power Cable	2EA
	RS-232C Cable	2EA
	RF Cable	3EA
	Carriage bag	1EA
	Antenna Cable	2EA
	Antenna Supporter	2set
	SMA Adaptor	7EA
	50 ohm Terminator	1EA
	Software program	1EA
	Textbook	1EA
	Answer sheet (Included in CD)	1EA
	Program CD	1EA

Antenna Training System

Model: MATS-1000

MATS-1000 includes RF Signal source of 0.3~6GHz.

It's used to educate Antenna Characteristics, Gain, Radiation Pattern, Impedance Matching and to Design & Manufacture Antenna.



MATS-1000 Features

1. RF signal generator is included
2. Practice for Antenna characteristics is possible
3. Signal frequency and Output power is variable.
4. Suitable for training Antenna design, manufacturing, measurement.
5. Practice is possible without extra measuring equipment
6. Auto calibration is included to set maximum input power position.

MATS-1000 Training contents

Part 1. Introduction and Installation of Program

- Chapter 1. Introduction of system
- Chapter 2. Program Installation and Instruction

Part 2. Practice for Antenna characteristics

- Chapter 3. Practice for Dipole antenna
- Chapter 4. Practice for Yagi antenna
- Chapter 5. Practice for Monopole antenna
- Chapter 6. Practice for Loop antenna
- Chapter 7. Practice for Ceramic Chip antenna
- Chapter 8. Practice for Inverted F antenna
- Chapter 9. Practice for Patch and Array Patch antenna

Part 3. Practice for antenna Impedance matching and antenna Gain measurement

- Chapter 10. Practice for antenna Impedance matching
- Chapter 11. Practice for antenna Gain measurement

Part 4. Practice for antenna Design and Manufacture

- Chapter 12. Manufacture of Dipole antenna
- Chapter 13. Manufacture of Loop antenna
- Chapter 14. Manufacture of Yagi antenna

MATS-1000 Specifications

Items	Specifications
RF	Frequency
	1) Variable in 300MHz~3000MHz,
	2) Variable in 5.0~6.0GHz
	Output power
	5 ~ -15dBm
	AGC
	25 [dB]
Antenna Types	Oscillation
	PLL frequency synthesized
	Impedance
	50[ohm]
	Supplied
	450 MHz : Dipole x2(PCB)
	915 MHz : Dipole x2, Monopole
Practice for Antenna Manufacturing	2.4 GHz : Dipole x2, Chip, Patch, Yagi x2,
	Inverted F, Array Patch, Loop
	5.6 GHz : Horn[Option], 5.8GHz Yagi
	2
	Yagi, Loop, Dipole
	Control Method
	Micro-Controller
Control	Antenna Angle Control
	360 ° , 3600 step
	0.1 ° / Step
	Angle Control Range
	0~360 °
	Motor Rotation
	Front, Back, Step

Antenna Training System Model: MATS-1000



MATS-1000 Functions

1. Practice for Antenna characteristics

1) Practice for the Radiation pattern [Supplying Antenna]

- Yagi antenna
- Chip antenna
- Dipole antenna
- Monopole antenna
- Loop antenna
- Patch antenna
- Inverted F antenna
- Array Patch antenna

2) Practice for the Antenna characteristics by varying source frequency

- Resonance frequency
- Gain

3) Practice for Designing, Manufacturing and Measuring the following:

- Yagi antenna
- Loop antenna
- Dipole antenna
- Practice in GUI Environment

2. Practice in GUI Environment

MATS-1000 Components

RFSG-1000	1Set	Text Book	1EA
Manufacturing antenna	3EA	Antenna	18EA
Antenna Base	2EA	Program CD	1EA
Wrench set	1Set	Antenna Fixing Bracket	2EA
Carrying Bag	1EA	Horn Antenna [Option]	1EA
50ohm Terminator	2EA		



RFSG-1000 Specifications

Items	Spec
Source Frequency	1) 300~3000MHz, -15 ~ +5dBm
	2) 5.0~6.0 GHz , -10 ~ +5dBm
Output Power	5 ~ -15dBm
Oscillation	PLL frequency synthesized
Impedance	50[ohm]

RF Signal Generator Model: RFSG-1000

RFSG-1000 Features

1. Role of High-Frequency Signal Generator
2. Variable Output Power
3. Variable Frequency

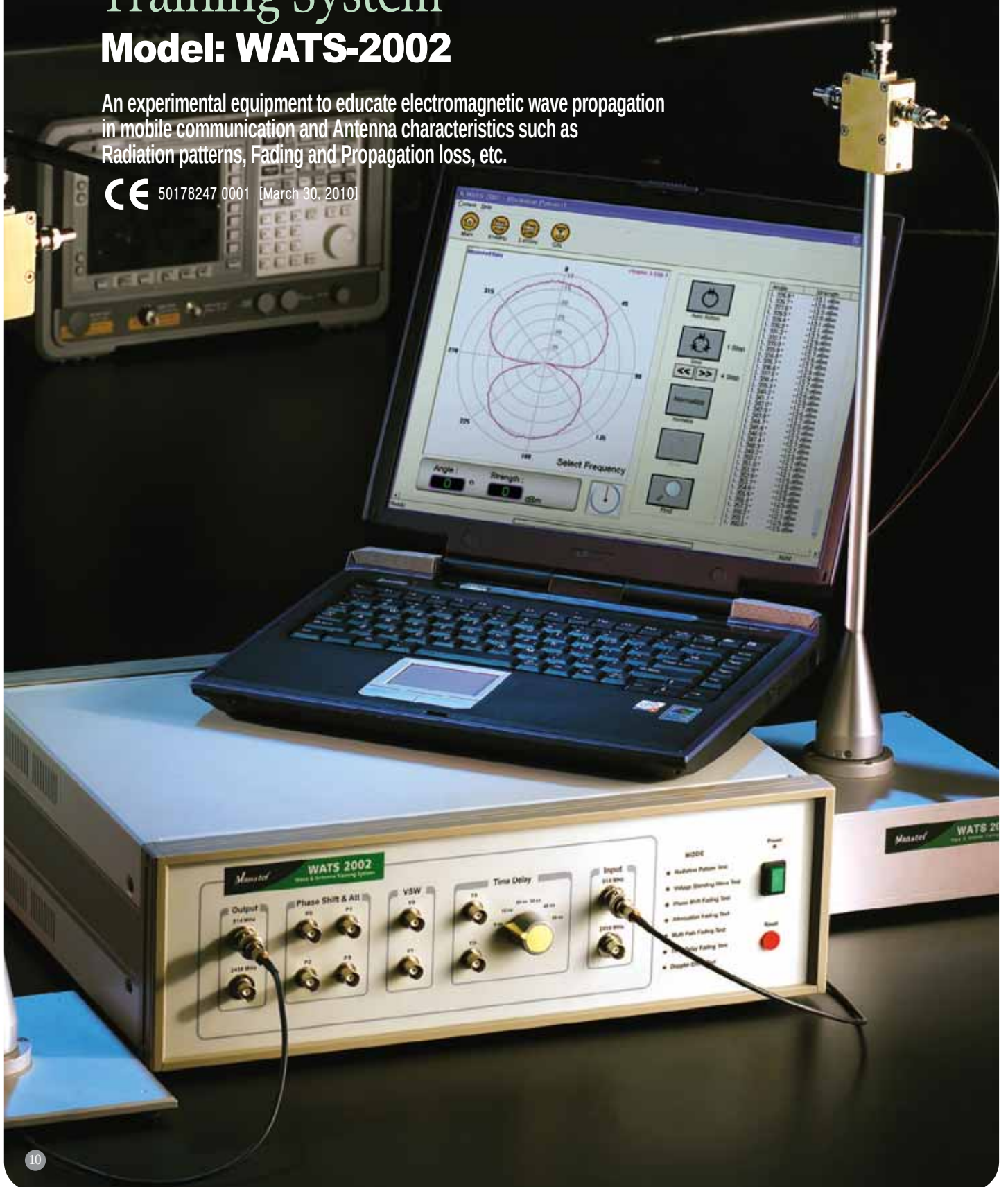
RFSG-1000 Components

Main System	1 Unit	RS-232 Cable	2EA
RF Coaxial Cable	2 EA	Adapter	1EA

Wave and Antenna Training System Model: WATS-2002

An experimental equipment to educate electromagnetic wave propagation in mobile communication and Antenna characteristics such as Radiation patterns, Fading and Propagation loss, etc.

CE 50178247 0001 (March 30, 2010)



Wave and Antenna Training System Model: WATS-2002



Antenna & Wave Propagation

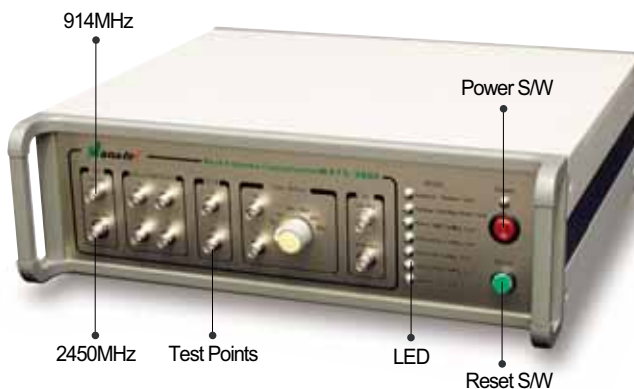
* Spectrum Analyzer and Laptop are purchased optionally.

WATS-2002 Features

- Most experiment is possible without extra measuring equipment.
- Antenna characteristics measurement.
- Mobile communication propagation experiment.
- Propagation modeling & Loss Simulation.
- Auto Calibration.
- User interface with GUI windows.

Wave and Antenna Training System Model. WATS-2002

An experimental equipment to educate electromagnetic wave propagation in mobile communication and Antenna characteristics such as Radiation patterns, Standing wave, Fading(Phase delay and attenuation), Doppler frequency and Propagation loss.



WATS-2002 Experiment Steps

- 1) Antenna characteristic Experiment
 - Radiation pattern measurement
 - Antenna manufacturing and characteristic measurement
- 2) Mobile communication propagation characteristics experiment
 - Fading experiment (phase delay, power attenuation, multi path)
 - Standing wave experiment
 - Time delay experiment
 - Doppler frequency experiment
- 3) Mobile communication propagation environments simulation
 - Propagation model simulation

WATS-2002 Training Contents

- Part 1. Introduction and Installation of Program
 Chapter 1 Introduction of WATS-2002
 Chapter 2 Program Installation and Instruction
- Part 2. Antenna characteristics Experiment
 Chapter 3 Dipole Antenna Characteristics Experiment
 Chapter 4 Yagi Antenna Characteristics Experiment
 Chapter 5 Monopole Antenna Characteristics Experiment
 Chapter 6 Loop Antenna Characteristics Experiment
 Chapter 7 Ceramic Chip Antenna Characteristics Experiment
 Chapter 8 Inverted F Antenna Characteristics Experiment
 Chapter 9 Patch and Array Patch Antenna Characteristics Experiment
- Part 3. Antenna Design and Manufacturing Experiment
 Chapter 10 Dipole and Yagi Antenna Production and Analysis Experiment
 Chapter 11 Loop Antenna Production and Analysis Experiment
- Part 4. Mobile Communication Propagation Experiment
 Chapter 12 Phase Delay Experiment
 Chapter 13 Power Attenuation Characteristic Experiment
 Chapter 14 Multi-Path Fading Experiment
 Chapter 15 Time Delay and Doppler Effect Experiment
 Chapter 16 Standing Wave Experiment
- Part 5. Mobile Communication Propagation Environments Simulation
 Chapter 17 Propagation Modeling and Propagation Loss Experiment



WATS-2002 Specifications

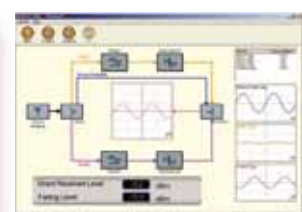
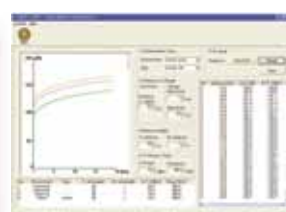
Items	Specifications
RF	Frequency
	914 [MHz] , 2.45 [GHz]
	Output Power
	+4.5 [dBm] Max
	Local Oscillation
	PLL
Antenna	Impedance
	50 [ohm]
	AGC Dynamic Range
	40 [dB]
	IF
	21.7 [MHz]
Control	Antenna
	Yagi, Chip, Dipole, Monopole, Loop, Patch, Inverted F, Array Patch
	Control Method
	Micro-controller
	Antenna Angle Control
	360 , 400 steps
	0.9 / steps
	Angle Control Range
	0~360
	Position Calibration
	Auto Calibration
	Motor Rotation
	Front, Back, Step

WATS-2002 Components

- Main body 1 EA
- Carriage Bag 1 EA
- Textbook 1 EA
- Antenna 14 EA
- Training Antenna 3 EA
- Antenna Base 2 EA
- RF Coaxial Cable 3EA
- 50ohm Terminator 2 EA
- RS-232C Cable 2 EA
- Adaptor 1 EA
- Wrench 1 SET
- Program CD(Multi-media CD) 1 EA
- Antenna Fixing Bracket 2 EA



CE



A group of Mobile Communication Trainers MT-3000

These equipments provide instructions on basic concepts of mobile communication to students who study for mobile communication, information technology and electronics.

Equipments for experiment
on mobile communication



MT-3000

MOBILE Telecom Trainer

Model: MT-3000

An experimental equipment to educate basic concept of the Full Duplex wireless system and Mobile telecommunication.

CE [November 23, 2010]

MOBILE Telecom Trainer Model: MT-3000

MT-3000 Features

- Full Duplex Voice & Data Communication
- Half Duplex Voice & Data Communication
- Practice of RF interference & mobile environment
- Chatting by using Computer.
- Board level and full system level experiment is available using one set
- Auto Mode and Manual mode can be selectable
- Built-in Software equal to the Commercial Products.
- Operating like as Commercial Mobile Products in Auto Mode.
- 16 x 2 Character LCD.
- LED Indicator.
- Over Charge Protection.



Mobile



MT-3000-B Base Set



MT-3000-M Mobile Set



MT-3000 Experiment Steps

- 1) Board Unit Module Experiment : Power, Audio, Control, Radio Frequency
- 2) Half Duplex Audio and Data Experiment : Half Duplex Transmitting and Receiving Experiment
- 3) Full Duplex Audio and Data Experiment : Full Duplex Communication Experiment
- 4) Mobile Environmental Experiment : RF Interference Experiment Among Systems
- 5) Data Communication : Chatting Practice by Serial Communication.

MOBILE Telecom Trainer Model: MT-3000

MT-3000 Training Contents

Part 1. Introduction of Products

- Experiment 1. Full Duplex Mobile Telecommunications Lab Equipment
- Experiment 2. Power Part

Part 2. Audio Frequency Part

- Experiment 3. Condenser Mike and Limiter
- Experiment 4. Compressor
- Experiment 5. Pre-emphasis and De-emphasis
- Experiment 6. Expander
- Experiment 7. Band-Pass Filter and Squelch Circuit

Part 3. Radio Frequency Part

- Experiment 8. PLL Oscillator I
- Experiment 9. PLL Oscillator II
- Experiment 10. Transmitting Part
- Experiment 11. Receiving Part

Part 4. Control Part

- Experiment 12. Microcomputer and Key Matrix Control Peripheral Circuits

Part 5. Full Duplex Communication

- Experiment 13. Half-Duplex Transmitting Integration Experiment
- Experiment 14. Half-Duplex Receiving Integration Experiment
- Experiment 15. Full-Duplex Integration Experiment
- Experiment 16. Radio Environment Experiment
- Experiment 17. Chatting by using Serial communication



MT-3000 Components

- | | | | |
|----------------|------|-------------------------------|------|
| • Mobile set | 1 EA | • Base set | 1 EA |
| • Carriage Bag | 1 EA | • Textbook | 1 EA |
| • Handset | 2 EA | • Program CD (Multi-media CD) | 1 EA |
| • Adaptor | 2 EA | • RS-232C Cable | 2 EA |

MT-3000 Specifications

Items		Specifications
RF	Communication Method	Full Duplex / Half Duplex
	Channel Access	Multi Channel Access
	Frequency Range	Base 46.51 ~ 46.97 [MHz]
		Remote 49.67 ~ 49.99 [MHz]
	Output Power	+4.5 [dBm] Max
	Channels	15 Duplex Channels
	Bandwidth / Channel	25 [kHz]
	Modulation	FM
	Frequency Stability	5 [ppm]
	Receiving Sensitivity	Over 20 [dB] SINAD (at -100 [dBm])
	Auto Channel Scan Time	200 [ms]
	Data rate	2,400 bps



MobileTelecom Board Level Kit

Model:
MT-1500

MT-1000 Features

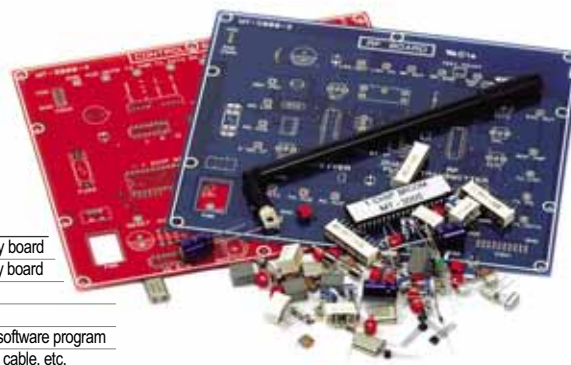
- Allowing students to train themselves about board manufacturing.
- Learning about parts and product through actual manufacturing.
- Capable of operation measurement for each circuit.
- Providing PCB designed with patterns.
- Capable of Full Duplex voice conversation training.
- Capable of Half Duplex voice conversation training.
- Capable of Detailed Module Training at Single Board Level.
- Training in full set experiment with four boards combined.

Kit Components

- 1) Parts for Radio Frequency board
- 2) Parts for Audio Frequency board
- 3) Parts for Power board
- 4) Parts for Control board
- 5) Microcomputer including software program
- 6) Handset, adaptor, coaxial cable, etc.
- 7) Operation Manual
- 8) Textbook

List of Training Contents and Specifications

Same as MT-3000 model.



A group of Network Communication Training System

ERT-5000 / WLAN-TS-1000

WLAN-VP-1000

Wireless LAN Video
Processing Training System



WLAN-VP-1000

Wireless LAN Training
System



WLAN-TS-1000

Embedded Network
programming and
Configuration



ERT-5000

Wireless LAN Training System

Model: WLAN-TS-1000

NEW

WLAN-TS-1000 Features

1) Wi-Fi practice board

- Wireless standards : IEEE802.11b/g/n
- Frequency range : 2.421~2.485GHz
- Data transmitting speed : 54Mbps ~ 1Mbps
- Serial cable connection to Wi-Fi Server
- Target Socket connection : Max 5 sec
- Best security via 64/128bit WEP, WPA, WPA2
- Simple AT command practice

2) Wireless LAN Protocol Analyzer

- The ability to capture : Protocol capture to 802.11 and higher-layer
- Frequency band : b/g/n
- Number of Protocol analyzer : Max 256
- Operating system : Windows XP
- Others : Channel switching function

WLAN-TS-1000 Functions

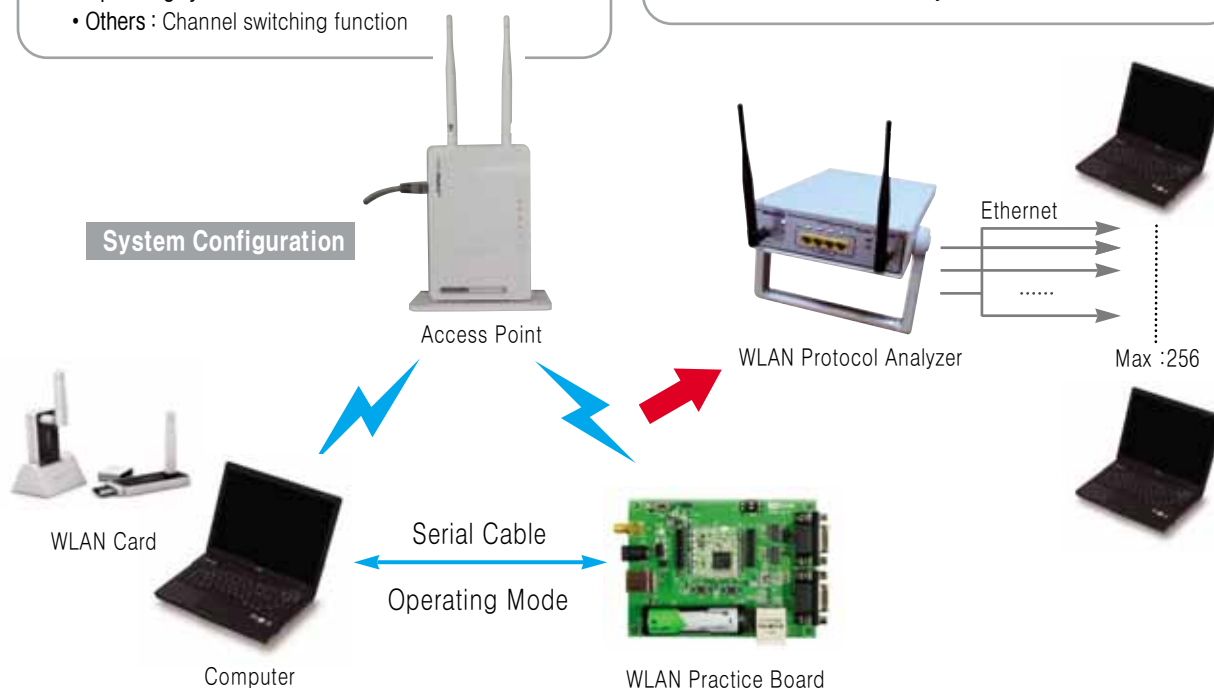
1) Wireless LAN technology

- Learn Wireless LAN technology
- IEEE802.11 b/g/n
- Wi-Fi configuration and demo

2) Wireless LAN configuration practice and Protocol analyzing practice

- Wi-Fi operation
- Protocol analyzer
- Wireless LAN Packet Analyzer

System Configuration



WLAN-TS-1000 is a training system to educate the basic WLAN technology, WLAN protocol analysis, integrated operation with peripheral devices.

Wireless LAN Training System is a advanced technology education equipment for Wi-Fi environment set-up experiment and protocol analyzing training through lessons about Wireless LAN (802.11 b/g) concept and experimental environment configuration practices.

WLAN-TS-1000 Specifications

1) Wi-Fi Evaluation Board

- Wireless

Item	Description
Wireless Standard	IEEE802.11b/g
Frequency Range	2.412~2.485GHz
Output Power (Tolerance(+/-1dBm))	10 dBm(10mW)
Receive Sensitivity	-92dBm@1Mbps -90dBm@2Mbps
Data Rates	54Mbps~1Mbps
Modulation	BPSK at 1Mb/s, QPSK at 2Mb/s

- Hardware

Item	Description
Interface	UART(2), SPI(Master, Slave), I2C(2), JTAG(5), Alarm(2), GPIO(6), Power U.FL(wireless)
Temperature	Operation : -40 ~85
Humidity	Operation : 10% to 90%, Non-Condensing Storage : 5% to 90%, Non-Condensing
Serial	Baud Rate : 1200bps~921,600bps, (Default : 115,200bps) Stop bits : 1 Parity : None, Odd, Even Flow Control : XON/XOFF(software), CTS/RTS(hardware), none
Power	3~3.63V dc
Power Consumption	100mA@operating mode, 7uA@sleep mode
Dimension	30mm 27mm 3.6mm

- Software

Item	Description
Serial Command Standard	ITU V.25ter AT Command Set
Operation Mode	Infrastructure, Ad-Hoc
Protocol	ARP, UDT, TCP, Telnet, ICMP, DHCP, PPPoE, BOOTP, HTTP, SMTP, TFTP, DNS, SNMPv1, IPv4
Security	WEP 64/128bit, WPA/WPA2(Enterprise) EAP-TLS, FAST, TTLS, PEAPv0/v1, 802.1 (Radius), SSL/TLS
Management	Console, User Interface

2) Access Point

- Wireless

Item	Description
Standard	IEEE 802.11b/g, 802.11n (draft 2.0)
Access type	CSMA / CA
Transmission method	DSSS, OFDM, Half Duplex
Frequency Range	2.412~2.472MHz (13채널)
Data rate	802.11b - Max. 11Mbps 802.11g - Max. 54Mbps 802.11n - Max. 300Mbps (2Tx-2Rx-2CH bonding)
Set up Environment	Wireless LAN connection wizard, AP search, join, authentication, association function, wireless channel selection
Antenna	802.11b/g/n external type(2eas)
Security	128/64bit WEP, WPA-PSK, WPA2PSK, WPS
Protocol	between Wireless and wired : L2 level bridging
Wireless bridge	WDS supported

- WAN Specifications

Item	Description
Standard	IEEE 802.3 / 802.3u(10Base-T, 100Base-TX)
Access type	CSMA / CD
Transmission method	4B5B MLT3 for 100Base-TX, Manchester coding fo 10Base-T
Connection type	1Static IP, DHCP Client, PPPoE
Security	VPN server (PPTP) included
Connector	Auto MDI-X, RJ-45
Data rate	160Mbps Max (LAN-to WAN, real time test data)

- LAN

Item	Description
LAN Switch	Store/Forward Switching, Wire-rate Switching
Connector	Auto MDI-X, RJ-45, 4 port
Special features	QoS, VPN Server, Worm Virus check,

- Dementions & power

Size	146 93 24 (mm)
Power	external DC adaptor

WLAN-TS-1000 Training contents

Part 1. Introduction to Wireless LAN technology

- Chap 1. Introduction to Wireless LAN
- Chap 2. Wireless LAN Fundamentals
- Chap 3. Wireless LAN Technology(IEEE802.11 b/g/n)

Part 2. System Experimental Environment

- Chap 4. System configuration and setting
 - Configuration and setting of wireless experimental boards
 - Configuration and setting of protocol analyzer

Part 3. WLAN packet structure and protocol analysis

- Chap 6. WLAN packet analysis
- Chap 7. WLAN search protocol analysis
- Chap 8. WLAN certification protocol analysis
- Chap 9. WLAN conjunction protocol analysis
- Chap 10. WLAN internet protocol analysis

3) Wireless LAN Protocol Analyzers

Item	Description
Capture Capability	Full 802.11 Capture and upper layer protocols
Frequency Bands	b/g/n.
Operating Systems	Windows XP
	Etc : Channel switching capability

4) Wireless LAN Card

- * IEEE 802.11b/g, 802.11n (draft 2.0) compatible

WLAN-TS-1000 Components

WLAN Evaluation board	2 ea
WLAN Protocol Analyzer	1 ea
Wi-Fi Access Point	1 ea
WLAN Card	1 ea
Textbook	1 book

Wireless LAN Video Processing Training System

Model: WLAN-VP-1000

WLAN-VP-1000 is a training system to educate the basic WLAN technology, WLAN protocol analysis, WLAN configurations and video based applications using Wireless IP camera. Wireless LAN Video Processing Training System is an advanced technology education equipment to learn WiFi standards and protocol analysis. This Training System also provides video processing practices from basic processing to face recognition.

NEW

WLAN-VP-1000 Features

- **Wireless Router**
Wireless Standard: IEEE 802.11b/g/n
Linux based firmware
Data rates up to 300Mbps
Strong security with 64/128bit WEP, WPA, WPA2
Wireless Distribution System capability
- **Wireless IP Camera**
High-sensitivity CMOS sensor
Optimized MJPEG video compression for transmission
Multi-level users management and passwords definition
Embedded Web Server
Support Wireless Network IEEE 802.11b/g
Support multiple network protocols

WLAN-VP-1000 Functions

This training system will help user to understand Wireless LAN Technology and IEEE 802.11 standard which covers Medium Access Control (MAC) and physical layers. WLAN-VP-1000 guides user to learn the Wireless LAN parameters and operation by including Linux command practices and protocol analyzing experiments. Wireless IP camera network configuration is included as an example of WLAN application. Advanced IP camera and wireless router configuration are provided to expose user with the enhanced features of WLAN technology. Additionally, WLAN-VP-1000 provides more than 20 examples of video processing algorithms including the basic color processing, geometrical transform, filtering, object detection and face recognitions. The user will gain a lot of experiences by programming those algorithms directly using C++ language. With the basic knowledge learned from WLAN-VP-1000, users can expand themselves in developing advance WLAN video based application or softwares for large wireless networks.

WLAN-VP-1000 Training contents

Volume I

Part I: Wireless LAN and System Components

- Chapter 1. Wireless LAN Technology
- Chapter 2. Introduction to System Components

Part II: System Installation

- Chapter 3. Software and Hardware Installation
- Chapter 4. Ubuntu 10.04 LTS Installation

Part III: Wireless LAN Tools and Protocol Analysis

- Chapter 5. Wireless Tools for Linux
- Chapter 6. WLAN Protocol Analysis

Part IV: Advanced IP Camera Configuration

- Chapter 7. IP Camera Handling with Common Gateway Interface
- Optional Chapter. Advanced IP Camera Network

Volume II

Part I: Introduction of Video Processing

- Chapter 1. Video Processing and Its Libraries

Part II: Tools Installation

- Chapter 2. WLAN Video Processing Tools and Test

Part III: Color Video Processing

- Chapter 3. Color Spaces
- Chapter 4. Pseudo Color Formation Practice
- Chapter 5. Color Slicing Practice
- Chapter 6. Color Correction Practice

Part IV: Basic Video Processing

- Chapter 7. Brightness, Contrast and Binarization Practice
- Chapter 8. Geometrical Transform Practice

Part V: Filtering

- Chapter 9. Spatial Filtering Practice
- Chapter 10. Frequency Domain Filtering Practice

Part VI: Frame Restoration

- Chapter 11. Frame Degradation
- Chapter 12. Noise Reduction Practice
- Chapter 13. Inverse Filtering Practice

Part VII: Object Detection and Recognition

- Chapter 14. Direct Matching Practice
- Chapter 15. Object Detection Practice
- Chapter 16. Object Recognition Practice
- Chapter 17. Face Detection and Recognition Practice

WLAN-VP-1000 Specifications

1) Wireless Router

- Wireless

Item	Description
Standard	IEEE802.11n (draft 2.0), IEEE802.11g, IEEE802.11b
Access type	CSMA / CA
Transmission method	DSSS, OFDM, MIMO
Frequency Range	2,412MHz ~ 2,462 MHz (Channels 1 ~ 11)
Data rate	802.11b ~ Max. 11Mbps 802.11g ~ Max. 54Mbps 802.11n ~ Max. 300Mbps
Set up Environment	Web based User Interface
Antenna	802.11b/g/n external type
Security	WPA2-PSK (AES, TKIP), WPA-PSK (AES, TKIP), 128/64-bit WEP MAC Address Filter
Access Mode	Infrastructure Mode
Wireless bridge	WDS supported

- WAN Specifications

Item	Description
Standard	IEEE 802.3 / 802.3u(10Base-T, 100Base-TX)
Access type	CSMA / CD
Speed and Flow Control	10/100, Auto-Sensing, Auto MDIX
Connector	RJ-45, 1 port

- LAN Specifications

Item	Description
Standard	IEEE 802.3 / 802.3u(10Base-T, 100Base-TX)
Access type	CSMA / CD
Transmission Encoding	100BASE-TX 4B5B/MLT-3, 10BASE-T Manchester coding
Speed and Flow Control	10/100, Auto-Sensing, Auto MDIX
Connector	RJ-45, 4 port

- Other

Dimesions (WxHxD)	200 65 280 (mm)
Power	Internal, AC 100~240V 0.5A / 5V 3A



WLAN-VP-1000 Composition

Wireless Router	1ea
Wireless IP Camera	1ea
USB Wireless Adapter	1ea
WiFi Terminal	option



Wireless Router



Wireless IP Camera

2) Wireless IP Camera

- Image Sensor & Lens

Item	Description
Sensor	1/4" Color CMOS Sensor
Display Resolution	640*480 Pixels(300k Pixels)
Lens	f: 3.6mm, F:2.4 (IR Lens)
Min. Illumination	0.5Lux
Lens Type	Glass Lens
Viewing Angle	67 Degree

- Video

Item	Description
Image Compression	MJPEG
Image Frame Rate	15fps(VGA), 30fps(QVGA)
Resolution	640 x 480(VGA), 320 x 240(QVGA), 160 x 120 (QQVGA)
Flip Mirror Images	Vertical / Horizontal
Light Frequency	50Hz, 60Hz or Outdoor
Video Parameters	Brightness, Contrast

- Communication

Item	Description
Ethernet	10/100Mbps RJ-45, 1 port
Supported Protocol	HTTP/TCP/IP/UDP/SMTP/DHCP/PPPoE/DDNS/UPnP/FTP
Wireless Standards	IEEE 802.11b/g
Data Rate	802.11b: 11Mbps(Max.), 802.11g: 54Mbps(Max.)
Wireless Security	WEP&WPA Encryption

- Physical and other

Item	Description
Pan/Tilt Angle	Horizontal:270° & Vertical: 120°
Infrared Light	10 IR LEDs,Night visibility up to 8 metres
Dimesions (WxHxD)	100 x 110 x 108mm
Power	External DC 5V/2.0A

3) USB Wireless Adapter

- Image Sensor & Lens

Item	Description
Standard	IEEE 802.11n (draft 2.0), IEEE 802.11g, IEEE 802.11b
Operating Frequency	2.412GHz ~ 2.471GHz, 13 Channel
Antenna	2dBi detachable
Reception Sensitivity	-65dBm at 130Mbps -74dBm at 54Mbps -84dBm at 11Mbps
Wireless Modes	Ad-Hoc / Infrastructure
Modulation	OFDM, CCK, BPSK, QPSK
Security	64/128 bit WEP, WPA-PSK, WPA2-PSK, (TKIP, AES)
MIMO	1Tx 1Rx
LED Indicator	Link / Act
OS Support	Windows XP, Vista, 7, Linux
Dimensions	85.8 x 25.2 x 10mm
Operating Temperature	00C ~ 500C



USB Wireless Adapter



WiFi Terminal(option)



Embedded Router Trainer

Model: ERT-5000

CE [November 17, 2010]

ERT-5000 Features

This is an educational equipment which enables user to have training over Network Configuration and Embedded Programming Practice on Internet Environment.

- 1) Embedded programming practice of TCP / IP protocol suite
- 2) Network configuration practice based on Router
- 3) TCP / IP protocol analysis
- 4) Embedded program porting practice

ERT-5000 Training contents

Vol. I Embedded Network Programming Experiments (for ERT-5000N)

Part I Embedded Network and Environment

- Chapter 01 Introduction to Routing Network System
- Chapter 02 Network Configuration Method
- Chapter 03 Introduction to ERT-5000 and Hardware

Part II Software Practice Environment of Embedded Network Board

- Chapter 04 System Installation
- Chapter 05 Loading and Debugging Environment

Part III Basic Practice for Embedded Programming

- Chapter 06 Practice for Demo Programming
- Chapter 07 Practice for Packet Transmission Programming
- Chapter 08 Practice for Packet Transmission and Receive Programming

Part IV Practice for Embedded Programming Application

- Chapter 09 Practice for Hyper-terminal Command Programming
- Chapter 10 Practice for Ethernet Interface Setting Programming
- Chapter 11 Practice for Ethernet Protocol Programming
- Chapter 12 Practice for ARP Programming
- Chapter 13 Practice for IP Programming
- Chapter 14 Practice for Ping Programming

Vol. II Embedded Router Experiments (for ERT-5000R)

Part I Embedded Router and It s Environment

- Chapter 1 Introduction to Routing System
- Chapter 2 Network Building Technique

Part II Practice of Static Routing

- Chapter 3 What are Default Route and Static Route
- Chapter 4 Practice of Default Route and Static Route Operation
- Chapter 5 Practice of Default Route and Static Route Programming

Part III Practice of Firesall

- Chapter 6 What s fire wall
- Chapter 7 Practice of fire wall Operation
- Chapter 8 Practice of fire wall Programming

Part IV Practice of RIP Routing

- Chapter 9 What is RIP Routing Lab
- Chapter 10 Practice of RIP Routing Operation
- Chapter 11 Practice of RIP Routing Programming

Part V OSPF Routing Test

- Chapter 12 VLSM and Aggregation
- Chapter 13 What s OSPF routing
- Chapter 14 Practice of OSPF routing Operation
- Chapter 15 Practice of OSPF routing Programming

ERT-5000 Software Program

1) Software Program for Manual 1

- DEMO Program
- ARP Program
- IP Program
- Ping Program

2) Software Program for Manual 2

- Static Routing Program
- RIP Routing Program
- OSPF Routing Program
- Firewall Program

ERT-5000 Components

• Main body	1 ea	• LAN Cable	4 ea
• Textbook	2 ea	• UART Cable	1 ea
• Program CD(Multi-media CD)	1 ea	• AC Cable	1 ea
• Print Cable	1 ea	• USB Cable	1 ea

ERT-5000 Functions

- 1) Understanding the concept of Network and Router
- 2) Hardware practice of embedded Network and router
- 3) ERT-5000N
 - Link and Compile of Application Program and RTOS
 - Loading and Verification of compiled program
- 4) ERT-5000R
 - Network Configuration Practice
 - RIP Router Configuration
 - Firewall Configuration
 - OSPF Router Configuration

ERT-5000 Specifications

Items	specification
CPU	Intel PXA255 400MHz (ARM RISC Chip)
RAM	SDRAM - 64 Mbytes
ROM	Nor Flash - 4 Mbytes
Nand Flash	64 Mbyte
Ethernet	CS8900 10 Mbytes 5 port
Serial port	Full UART 1 Port
AC Power	100 / 220V 1.5A
USB Interface	Ver 2.0

A group of RFID Training System

RFID-13.56 / RFID-EPC / RFID/USN-6000

RFID-3000 / RFID-5000

These equipments provide instructions on basic concept, protocol, programming and hardware of RFID, as well as practical techniques used in RFID applied shopping system and administration of physical distribution.

RFID applied administration
of physical distribution



RFID-5000

RFID/USN theory &
programming, Middleware
application



RFID/USN-6000

RFID applied shopping
system



RFID-3000

Equipment for experiment
on RFID-EPC Global



RFID-EPC

Equipment for
RFID basic training

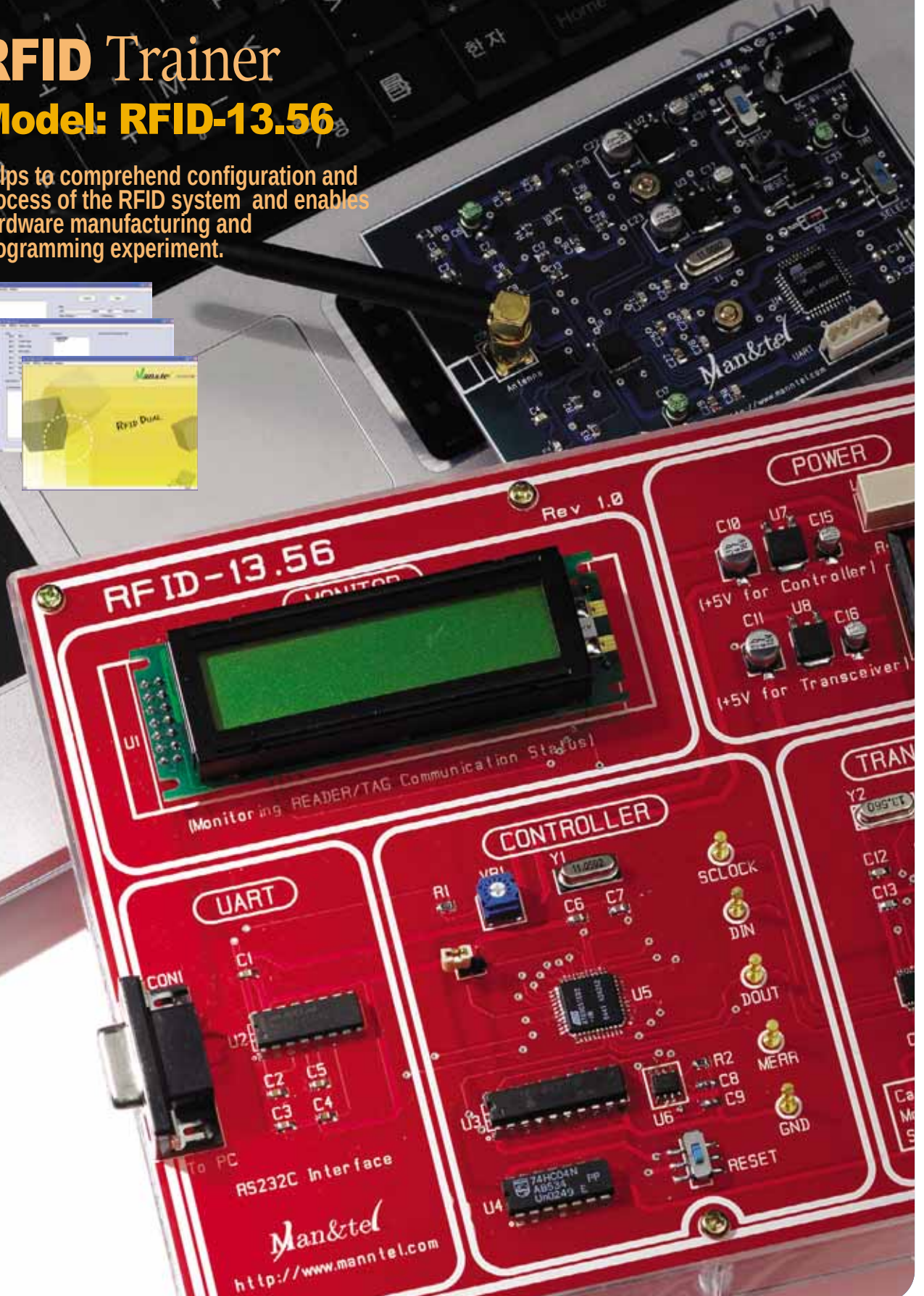


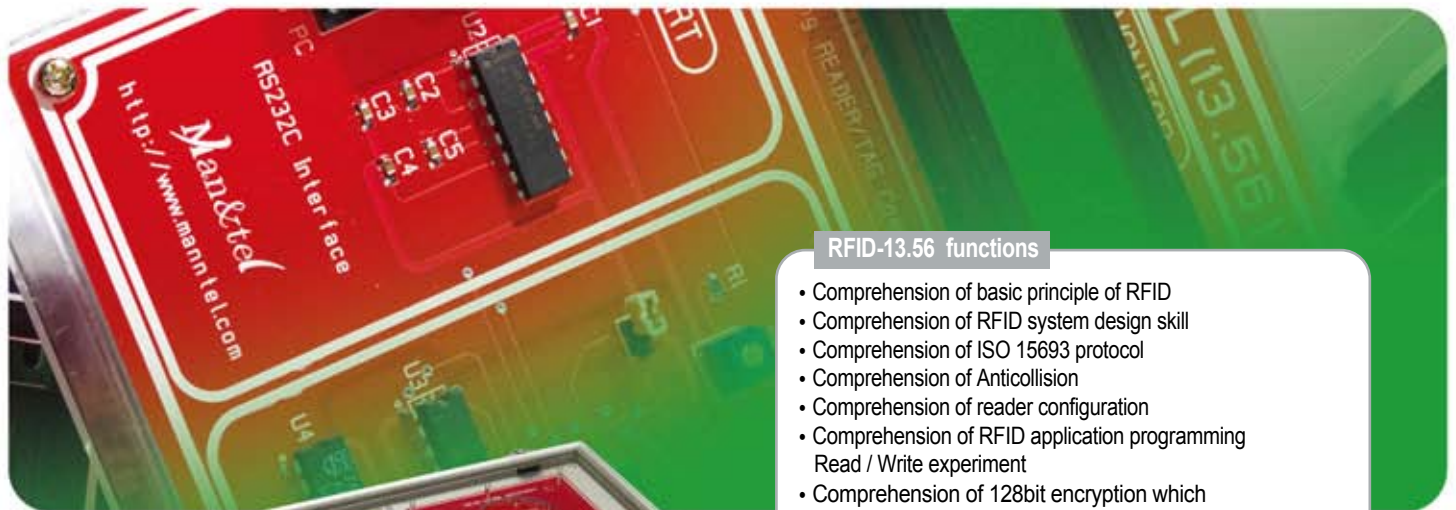
RFID-13.56

RFID Trainer

Model: RFID-13.56

Helps to comprehend configuration and process of the RFID system and enables hardware manufacturing and programming experiment.





RFID-13.56 functions

- Comprehension of basic principle of RFID
- Comprehension of RFID system design skill
- Comprehension of ISO 15693 protocol
- Comprehension of Anticollision
- Comprehension of reader configuration
- Comprehension of RFID application programming
Read / Write experiment
- Comprehension of 128bit encryption which was applied to RFID system

RFID-13.56 training contents

Part1. Introduce of RFID

- Chapter 1 RFID Theory
- Chapter 2 Hardware Setup and Operation
- Chapter 3 Hardware Configuration and Exercise

Part2. RFID Protocol

- Chapter 4 Packet Structure
- Chapter 5 Anticollision
- Chapter 6 CRC Algorithm
- Chapter 7 Demo Program Operation Exercise
- Chapter 8 RFID Command Operation Exercise
- Chapter 9 RFID Command Programming Exercise
- Chapter10 RFID Packet Monitoring Programming Exercise
- Chapter11 RFID Packet Emulation Programming Exercise

Part3. API Application Programming

- Chapter12 Understanding of API
- Chapter13 Example Programming Exercise
- Chapter14 API Application Programming Exercise
- Chapter15 RFID application practice Demo
- Chapter16 Demo program for RFID application practice
- Chapter17 RFID application demo programming

RFID-13.56 Specifications

Frequency	13.56 MHz(Module1)
Protocol	ISO 15693(13.56 MHz only)
Transpond Type	Vicinity Card(13.56 MHz)
Field Range	3Cm(13.56 MHz)
PC Interface	RS-232C

RFID-13.56 Components

Items	name	specification	number	remark
13.56 MHz	Reader	13.56 MHz	1EA	
	Tag	Vicinity Card	3EA	more than 3 is option
	PC Interface	RS-232C	1EA	
	Antenna cable	RFcable	1EA	
	Adaptor	9V DC	1EA	
	Antenna of Reader	13.56 MHz	1EA	
	Textbook		1EA	
	Carring bag	Aluminum	1EA	
	Program CD		1EA	



13.56MHz Reader and Passive tag

RFID-EPC Global Trainer

Model: RFID-EPC

RFID-EPC is an experimental equipment to educate Protocol and Programming for EPC Global Network, Middleware application, Encryption.

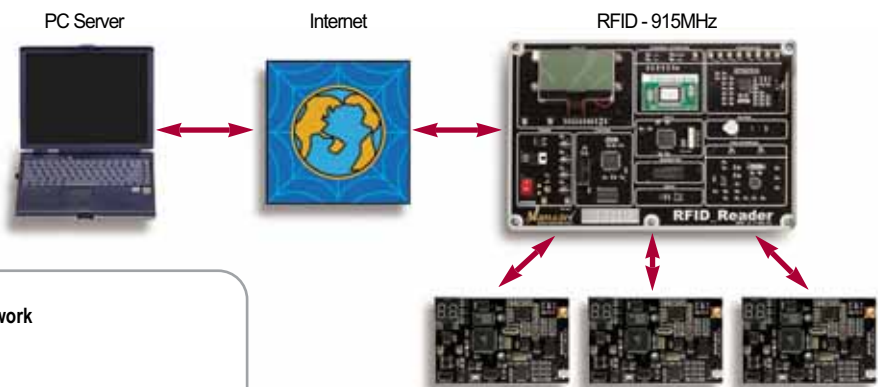
RFID-EPC Features

This RFID Training system presents the RFID operation and standardization processes. There are one types of tags - active tag(915MHz). Active tags has a built-in power supply that allows long-distance communication reaching to 13 meters.

1. Training using EPC Global Network
2. Practice for EPC Global Network Theory
 - Protocol Exercise between Reader and Tag
 - Middleware Programming
3. Practice for Tag Data read/write
4. Mapping Tag Data to real product
5. Internet Connection between Reader and Server.
6. Database Construction coinciding Tag Data with Real Product.
7. Middleware Application.

RFID-EPC Functions

- Embedded System Training of Active Tag on EPC Global Network
 - Read/Write Practice for Tag data
 - Embedded Programming at Tag using JTAG
 - Programming Exercise to Protocol Processing between Reader and Tag
 - Programming for Tag Data Processing Techniques



RFID-EPC Training contents

Part 1. Introduction to EPC Global Network

- Chapter 1 EPC Global Network Theory
- Chapter 2 Packet Structure
- Chapter 3 EPC Tag Structure

Part 2. System Setup and Operation of EPC Global Network

- Chapter 4 Hardware Setup and Operation
- Chapter 5 Software Installation and Operation

Part 3. Practice for Embedded EPC Reader Programming

- Chapter 6 EPC System Demo Operation
- Chapter 7 Demo Operation of Reader and Tag
- Chapter 8 Packet Transmission Programming
- Chapter 9 Packet Receiving Programming
- Chapter 10 Internet Interface Programming
- Chapter 11 Reader Programming

Part 4. Middleware Application and Programming

- Chapter 12 Data Transfer Programming between Reader and Server
- Chapter 13 Reading Programming for EPC Tag Data
- Chapter 14 Writing Programming for EPC Tag Data
- Chapter 15 Middleware Programming for EPC Data Processing

Part 5. Practice for Encryption Application

- Chapter 16 Data Encryption

RFID-EPC Specifications

1) General	- Operating Voltage	Reader	5.0V	5%
		Tag	3.3V	
	- state monitor	Reader	128*64 Graphic LCD	
		Tag	16*2 char LCD	
	- tag type		Active tag(915MHz)	
2) Active type (915 MHz)	(1) Reader Machine			
	- RFID Chip		ADF7020	
	- Power jack A		9V, Radial	
	- Switch 1		2 Pin Switch (Rocker Switch)	
	- Switch 2		4 Pin, Radial (Tact Switch)	
	- USB Connector		5 Pin	
	- SMA Connector		5 Pin, Female, Straight	
	- PE12864		Graphic LCD (128 *64)	
	- Header		5 * 2 Pin	
	- SND3620SR		FND, 10 Pin, DIP	
	- PCB		255*170, FR4, 1.6T	
	(2) Tag			
	- LED		Chip LED, red	
	- ADF7020		400M / 900M FSK / ASK Transceiver	
	Switch 1		6 Pin, SMD	
	Switch 2		2 Pin SMB (Tact Switch)	
	PCB		100 * 70, FR4, 1.6T	
	Battery Socket		AA Size 3 EA	
	Bolt		Flat Head screw, 3 pie	
	Nut		3 pie	
3) Anrenna	- type		Mono-pole Antenna, 915MHz, 100mm	
	- effective distance		3 ~ 5m, 10m (two steps adjustable	

RFID-EPC Components

Div	Items	Spec	Q ty
915Mhz	Reader	915MHz	1EA
	Tag	Module	3EA
	PC Interface	USB	1EA
	Adaptor	9V DC	1EA
	Antenna	915MHz	4EA
	AA Battery(1.5V Battery, 3EA)		3Set
	USB Cable		4EA
	Textbook		1EA
	Carrying bag		1EA
	Program CD		1EA

RFID/USN Training System

Model: RFID/USN-6000

RFID/USN-6000 is an experimental equipment to educate EPC Global Network, RFID/USN theory & Programming, Middleware application and Sensor data conversion.





RFID/USN-6000 Training Contents

Part 1. Introduction of RFID/USN

- Chapter 1 USN Technology based on RFID
- Chapter 2 Hardware Structure and Setup
- Chapter 3 Software Installation and Practice

Part 2. Packet Structure for RFID/USN Implementation

- Chapter 4 Packet Structure of Class 1 Gen. 2 Air Interface
- Chapter 5 Middleware Packet Structure

Part 3. Embedded USN Tag Programming

- Chapter 6 Loading and Debugging
- Chapter 7 Demo Program Operation
- Chapter 8 Attachment
- Chapter 9 Embedded Tag Programming
- Chapter 10 Tag Data Writing Programming
- Chapter 11 Tag Sensing Data Reading Programming at Tag

Part 4. Middleware Application Programming

- Chapter 12 Middleware Server Programming
- Chapter 13 Tag Sensing Data Reading Programming at Server
- Chapter 14 Tag Data Processing Programming

Part 5. Encryption Application

- Chapter 15 Tag Data Demo Operation

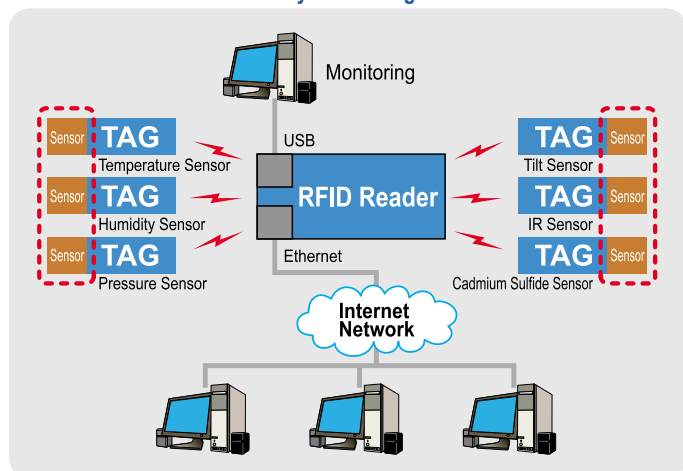
RFID/USN-6000 Functions

- 1) Low Power Processor
 - Reader : Atmega128L 16MHz Operating Voltage 5V
 - TAG : Atmega128L 8MHz Operating Voltage 3.3V
- 2) Project Developing Function by using various Sensor Modules
- 3) Monitoring by using USB 2.0
- 4) Programming using JTAG
(Emulator is optional)
- 5) External Connection available using Ethernet
- 6) 128*64 Dots Graphic LCD
- 7) Alarm by Buzzer

RFID/USN-6000 Features

1. RFID/USN by EPC Global Network
 - Understanding RFID/USN Theory.
 - Sensor Data Processing Technology using RFID/USN.
2. Active Tag / Embedded System Programming
 - Embedded Programming Education of Sensor Data Processing using RFID/USN based on AVR Environment.
3. Encryption of Data which is transmitted/received between Tag and Reader
 - Encryption Technique of Sensor Data, and its Algorithm Processing Technology.

RFID/USN System configuration



RFID/USN-6000 Specifications

Div		Spec
Board Size		255(W) X 170(L)
DC Adapter	Reader	DC 9V / 1A / 100V or 220V AC
	TAG	USB, or AA Battery (1.5V Battery, 3ea)
Communication	Monitoring	USB 2.0
	Ethernet	1 Port 10Base-T
Graphic LCD	Reader	128*64 Dots, LED Navy Blue Back Light
Reader	Microcontroller	ATMEGA 128-16AL(16MIPS)
		Advanced RISC Architecture
		Nonvolatile Program and Data Memories
		JTAG (IEEE std. 1149.1 Compliant) Interface
		Operating Voltages : 4.5-5.5V for ATmega128
	SRAM	32Kbyte
	User Interface	Buzzer
	RFID	Frequency
		900MHz Band
		ATMEGA 128-8AL(8MIPS)
Tag	Microcontroller	Operating Voltage : 3.3V
		User Interface
		Speaker
	Monitoring	FND

RFID/USN-6000 Components

Div	Items	Q ty
Basic	RFID Reader	1EA
	RFID Tag	3EA
Module	Temperature Sensor	1EA
	Humidity Sensor	1EA
	Tilt Sensor	1EA
	Pressure Sensor	1EA
	IR Sensor	1EA
	Cadmium Sulfide Sensor	1EA
Accessories	USB Cable(USB A-USB B)	1EA
	USB Cable(USB A-mini USB)	3EA
	JTAG	1EA
	Antenna(915 MHz)	4EA
	Ethernet Cable	1EA
	Adaptor	1EA
	Program CD	1EA
	Textbook	2EA
	Battery (1.5V, AA)	9EA



RFID Shopping System

Model: RFID-3000

RFID-3000 Features

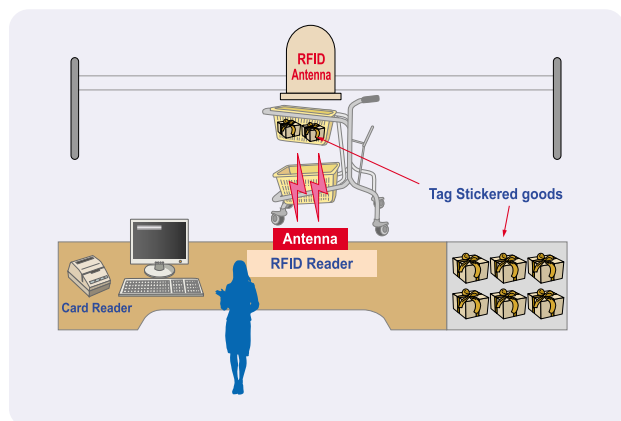
RFID Shopping System, which could replace the Bar-code system, can be actually applied to commercial products as well as educational use. RFID Shopping System is not the system identifying each product's price one by one like bar-code system but the system identifying the whole items at short time through its technology.

That is, Reader identifies every goods' price at one time through Tags which are attached to every goods.

Total amount of prices loaded in one shopping cart identified by Reader is automatically calculated and the information is transmitted to PC.

More detailed explanation is as below ;

- 1) put the goods with tag into shopping cart.
- 2) if the shopping cart passed the counter, RFID Antenna identify the UID information from every goods through the Tag and the information is transmitted to PC server.
- 3) every goods information and its prices are displayed on PC monitor calculating total amount of prices and identifying the list of items.
- 4) if user present RFID Tag(card) to Card Reader, the purchased amount is counted.



RFID Shopping System(RFID-3000)

RFID-3000 Specifications

RFID Shopping System

Main system	Frequency	902.75 MHz ~ 927.25 MHz
	Protocol	EPC Global Class 0, 0+, 1, Gen2 Class 1
	sensing range	MAX 6~7m
	Communication	RS-232C(DB-9 F), LAN TCP/IP(RJ-45)
	Antennas	2EA(maximum 4EA connecting)
	TAG type	Passive
Counting system	Frequency	13.56MHz
	Protocol	ISO 15693
	detecting distance	3Cm~5Cm
	Communication	RS-232C
	Modulation	ASK/FSK
	TAG type	Passive

RFID Logistic System

Model: RFID-5000

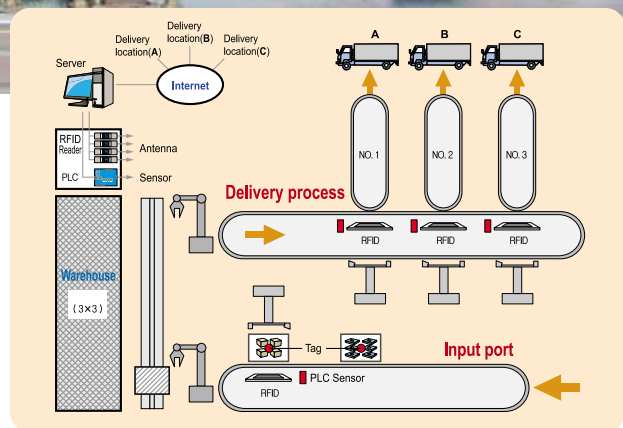
RFID-5000 Features

By deploying RFID Reader and Antennas to the path where the goods are input and distributed, user could know the followings ;

- 1) ordering status from PC monitor which RFID operation S/W is downloaded
- 2) input information of goods such as item, price and quantity.
- 3) stock status which is stored into the rack
- 4) inferior goods information which is sorted out while moving from input conveyor belt to rack.
- 5) delivery order information
- 6) distributing goods information after transporting to ordered place

As above process information is acquired by tag stuck on every goods. That is, if the good is passed over one place to another the good's information is identified by Reader, Antenna and Tag.

The information is transmitted to PC and its trace counted by RFID Logistic System. In conclusion, user can learn how to deploy and test RFID systems under real-world conditions to increase efficiency and cut costs & etc.



RFID Logistic System(RFID-5000)

RFID-5000 Specifications

RFID Logistic System

Warehousing of goods Storing rack	Magazine Unit	Cylindrical type 30
	Structure	Storing goods by rack type (3layer 2line, open type)
	Size	106L 47W 294H mm
	Loading q'ty	6EA
	Sensor	type : MICRO SWITCH type : light sensing - ON , NPN Type Open-Collector
Shifting devices for storage	right and left transport	cylinder shifting (X-AXIS) - TCDMF20-50
	front and rear transport	cylinder shifting (Y-AXIS) - TGQM-16-50
	up and down transport	MOTOR use (Z-AXIS)
		rated voltage : 1 ϕ 220V 50/60Hz 6W
		rotating speed : [1250/1550][RPM] (1/5 decelerating gear)
Goods delivery devices	structure	rack type
	size	60L X 50W X 80H mm
Control Box	structure	tower type
	size	520L X 170W X 400H mm
	input switch	type : ϕ 12, Non-Lock, Normal Open(N.O) Type / red color
	output switch	type : ϕ 12, Non-Lock, Normal Open(N.O) Type / green color
	reset ordering switch	type : ϕ 12, Non-Lock, Normal Open(N.O) Type / red color
Sensor	emergency switch	type : ϕ 16, Lock, Normal Open(N.O) Type / red color
	structure	optical fiber sensor
	maximum detecting distance	120mm(variable type)
	minimum detecting size	0.03
Conveyor	type	light sensing - ON , NPN Type Open-Collector
	type	BELT CONVEYOR type
	rated voltage	1 ϕ 220V 50/60Hz 6W
	rotating speed	[1250/1550][RPM] (1/30 decelerating gear)
PLC Unit	CPU	programming : IL, LD, SFC
		memory : 68Kbyte
	Power	DC24V/ AC220V/ 1A
RFID devices	INPUT	DC 24V input 16point
	OUTPUT	OUTPUT relay 16point
	structure	fixed type
	Frequency	13.56MHz
	protocol	ISO 15693
	detecting distance	3Cm~5Cm
	Communication	RS-232C
	modulation	ASK/FSK
	TAG type	Passive

A group of Bluetooth Telecom Training System

BT-2007 / BT-3000 / BT-1000

BEHK-100 / MBS-100

This equipment provides step-by-step instructions on bluetooth techniques from its basic program and hardware operation to commercial products of Bluetooth



Bluetooth stereo earset

MBS-100

Equipment for
experiment on Bluetooth
embedded headset

BEHK-100

Wireless control for
Industrial products

BT-3000

Equipment for experiment
on Bluetooth
communication

BT-2007



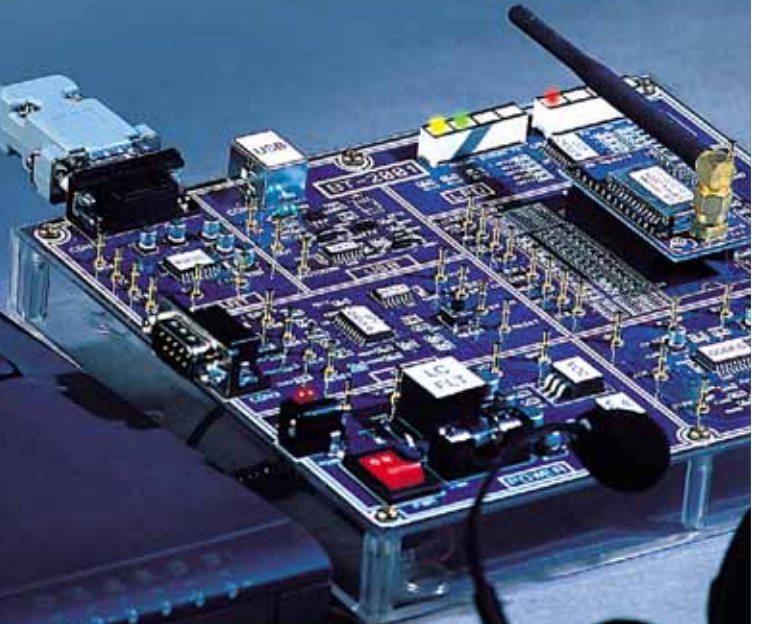
BLUETOOTH

Telecom Trainer

Model: BT-2007

An experimental equipment to educate Bluetooth technology for software protocol stack and hardware through step by step experiment.

SIG : Approval [QPN-BMTK-040004]





BT-2007 Features

- Protocol Analysis and Simulation / Emulation
 - * Protocol Training
 - Protocol Processing Procedure
 - Protocol Learning
 - Protocol Signaling
 - * Profile Training
 - Profile Learning
 - Profile Signaling
 - Profile Processing Procedure
- Demo Function
 - Audio Conversation
 - File Transfer
 - Chatting
- Data Communication Experiment Using Various Interface. (USB, UART)
- Hardware Experiment is Available.
- Multi Purpose Usage. (Education, Research and Development)
- Bluetooth Host Programming.
- Options for Application.
- Full Documents.

Bluetooth



BLUETOOTH

Telecom Trainer
Model: BT-2007

BT-2007 is An experimental equipment to educate Bluetooth technology for software protocol stack and hardware operation procedure through step by step experiment.



BT-2007 Experiment Steps

- 1) Hardware Experiment : Theoretical and Practical Hardware training about Bluetooth Technology
- 2) HCI Protocol Experiment : Theoretical and Practical training on HCI Protocol
- 3) L2CAP Protocol Experiment : Theoretical and Practical training on L2CAP Protocol
- 4) RFCOMM Protocol Experiment : Theoretical and Practical training on RFCOMM Protocol
- 5) SDP Protocol Experiment : Theoretical and Practical training on SDP Protocol
- 6) Protocol Stack Experiment : Understanding Overall Structure of BT Protocol and Programming
- 7) Profile Stack Experiment : Understanding FTP Profile

BT-2007 Training Contents

Part I Introduction

- Overview 1. What is Bluetooth
- Practice 1. Installation Settings & Application Software

Part II Hardware

- Practice 2. Power
- Practice 3. Interface
- Practice 4. Codec
- Practice 5. RF Module

Part III Bluetooth Protocol Monitoring

I. HCI Protocol Monitoring

- Practice 6. HCI Initialization and Inquiry
- Practice 7. HCI Connection
- Practice 8. HCI Disconnection
- Practice 9. HCI Data Transmission

II. L2CAP Protocol Monitoring

- Practice 10. L2CAP Connection
- Practice 11. L2CAP Disconnection
- Practice 12. L2CAP Data Transmission

III. RFCOMM Protocol Monitoring

- Practice 13. RFCOMM Connection
- Practice 14. RFCOMM Disconnection
- Practice 15. RFCOMM Data Transmission

VI. SDP Protocol Monitoring

- Practice 16. Data Transmission between SDP Client and Server

Part VI Bluetooth Protocol Emulation

- Practice 17. Protocol Stack Emulation

Appendix

- Appendix A. Monitoring Programming File Separation
- Appendix B. References



BT-2007 Components

- | | | | |
|------------------------------|------|--------------|------|
| • Carriage Bag | 2 EA | • UART Cable | 2 EA |
| • Headset | 2 EA | • SPI Cable | 1 EA |
| • Adaptor(DC 9V/1.5A) | 2 EA | • Antenna | 2 EA |
| • Textbook | 1 EA | • BT module | 2 EA |
| • Program CD(Multi-media CD) | 1 EA | | |
| • Main body | 2 EA | | |
| • USB Cable | 2 EA | | |



BT-2007 Specifications

Items	Specifications	
General	Bluetooth Firmware Version	HCI_V16.4
	Bluetooth Specification Version	V1.1
	Bluetooth Core chip	CSR BlueCore02-External
	Bluetooth Module	BlueSEM II
	Interface	UART, SPI, USB
	Codec Filter	13bit Linear PCM
RF	Operating Frequency Range	2402 ~ 2480 [MHz]
	Occupied Channel Frequency	1 [MHz]
	Transmit Power Level	+4 [dBm] (Class 2)
	Receive Sensitivity	-80 [dBm]
	Antenna	Dipole

* Spec can be upgraded anytime

BT-2007 Options

Option 1 : [Power : Class 2, +4 dBm max]

Hardware : Headset + Audio gateway + Earphone

Software : Software program is installed in the core chip.

- Demonstration of Voice communication between two BT-2007s or BT-2007s with mobile phone.

- Hardware Experiment is available with Headset

- Example using Bluetooth embedded system.

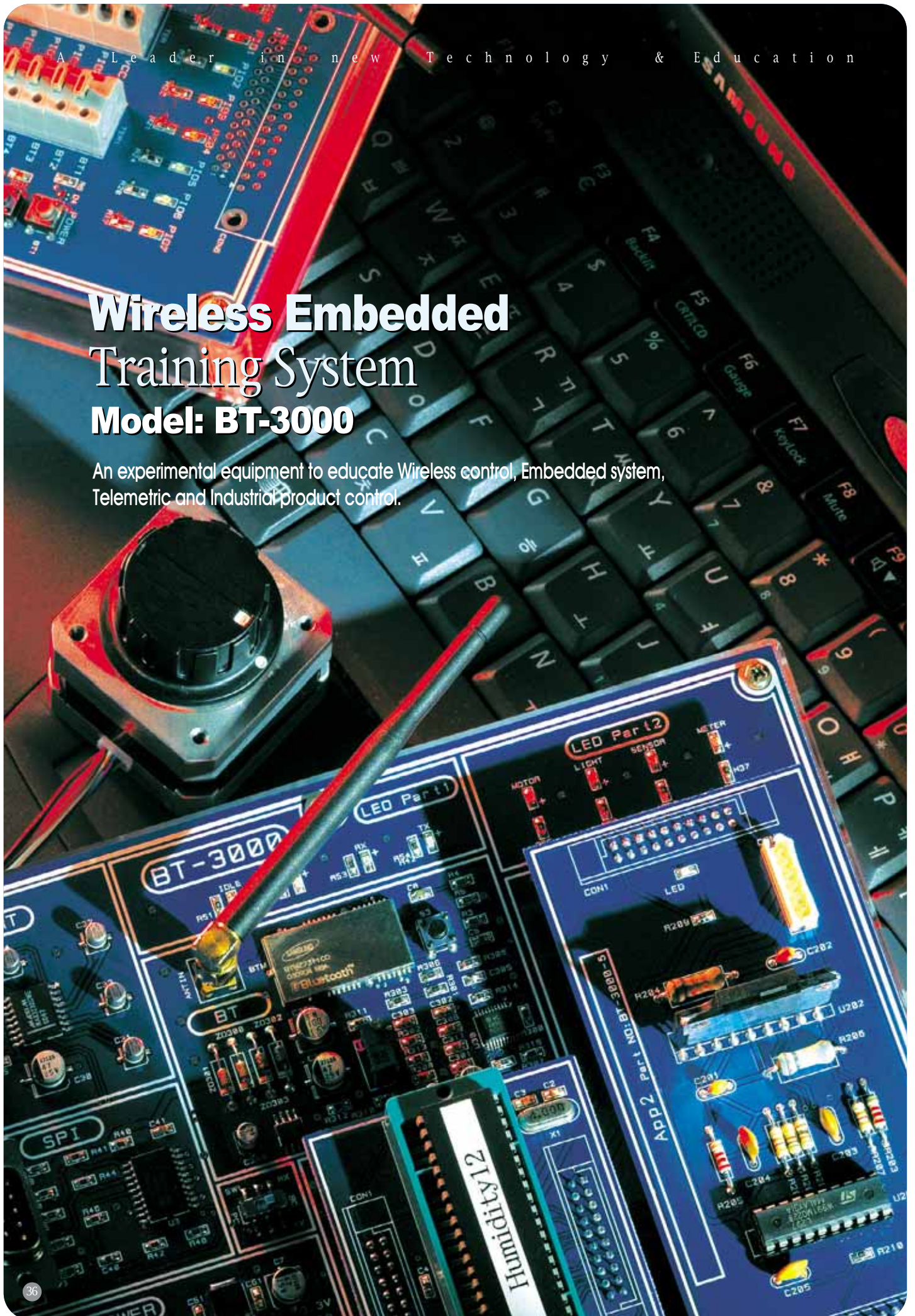
- Commercial Hands-Free Product Included



Option 1, 2

Wireless Embedded Training System Model: BT-3000

An experimental equipment to educate Wireless control, Embedded system,
Telemetric and Industrial product control.





BT-3000 Features

Wireless Embedded Training System, BT-3000 was developed to educate wireless control and embedded technology.

Its distinguished technology compared to wired embedded system is wireless control using Bluetooth protocol. Wireless embedded technology will be used in application of Home networking, Ubiquitous sensor networking, Telemetric and Industrial control in near future.

Through experiment using BT-3000 students learn hardware design and wireless communication protocol easily. Hardware design includes Controller and modules and software design including bluetooth communication protocol.

BT-3000 Functions

- Embedded educational Training system by GUI control.
- Experiment of concentrated wireless embedded system using application module.
- General education to industrial embedded system.
- Software and Hardware training to each module.
- Experiment of Embedded programming using controller.
- Detail experiment using thirteen modules.
- Experiment of communication protocol Programming.
- Manufacturing of sensor hardware module.

Wireless Embedded

Wireless Embedded Training System Model: BT-3000

An experimental equipment to educate Wireless control and embedded Technology, application of Telemetric and Industrial product control.



BT-3000 Training Contents

Part I. Introduction

- Chapter 1 Introduction to Wireless embedded System
- Chapter 2 Understanding of the PIC Microcontroller
- Chapter 3 Understanding of the Server Program and Its Operational principle
- Chapter 4 Understanding of the Bluetooth Technology

Part II. Basic Wireless

- Chapter 5 Inquiry Response to the wireless equipment
- Chapter 6 Connection to the wireless equipment
- Chapter 7 Wireless Data/Voice Communication
- Chapter 8 Disconnection to the wireless equipment

Part III. Wireless Application

- Chapter 9 Remote DC/STEP Motor Control
- Chapter 10 Remote Power/Current Control
- Chapter 11 Remote Temperature Sensor Control
- Chapter 12 Remote Infrared Sensor Control
- Chapter 13 Remote Touch Sensor Control
- Chapter 14 Remote Ultrasonic Sensor Control
- Chapter 15 Remote Gas Sensor Control
- Chapter 16 Remote Humidity Sensor Control
- Chapter 17 Remote Pressure Sensor Control

Reference

- A. Conn7 Pin Layout in the Slave board



BT-3000 Components

Main Server Package (BT-3000M)

- | | | | |
|---------------------|------|---------------------------------|------|
| • Server hardware | 1 EA | • SPI cable | 1 EA |
| • Server program CD | 1 EA | • Textbook | 1 EA |
| • Bluetooth module | 1 EA | • Power adaptor(9V 1A, 50/60Hz) | 1 EA |
| • Antenna | 1 EA | • Carriage & Storage bag | 1 EA |
| • USB cable | 1 EA | • PIC16F877(DEMO) | 2 EA |
| • UART cable | 1 EA | • PIC16F877(PRACTICE) | 2 EA |
| • Ear-microphone | 1 EA | | |

Motor/Power Control Experiment Package(BT-3000SM)

- | | | | |
|------------------------------|------|------------------------------------|------|
| • Slave Hardware | 1 EA | • Antenna | 1 EA |
| • Light Control | 1 EA | • DC Motor | 1 EA |
| • Current Control | 2 EA | • Step Motor | 1 EA |
| • Controller module | 1 EA | • Power Adaptor(12V 1.5A, 50/60Hz) | 1 EA |
| • DC Motor experiment module | 1 EA | • Carriage & Storage Bag | 1 EA |
| • Step Motor Exp. module | 1 EA | • Ear-microphone | 1 EA |
| • UART Cable | 1 EA | • Electric bulb | 1 EA |
| • SPI Cable | 1 EA | | |

Sensor Control Experiment Package(BT-3000SS)

- | | | | |
|--------------------------------------|------|------------------------------------|------|
| • Slave hardware | 1 EA | • SPI Cable | 1 EA |
| • Temperature sensing control module | 2 EA | • Controller module | 1 EA |
| • Infrared sensor control module | 2 EA | • Antenna | 1 EA |
| • Touch sensor control module | 1 EA | • FAN motor | 1 EA |
| • Ultrasonic wave control module | 1 EA | • Power Adaptor(12V 1.5A, 50/60Hz) | 1 EA |
| • Gas sensor control module | 1 EA | • Carriage & Storage Bag | 1 EA |
| • Pressure sensor control module | 1 EA | • Ear-microphone | 1 EA |
| • Humidity sensor control module | 1 EA | | |
| • UART Cable | 1 EA | | |

BT-3000 RF Specifications

RF Specifications	Chipset Maker	CSR Core Chip Set (AirLogic Module)	
	Chipset specification	Bluetooth Ver1.1 or 1.2	
	Range	10m(Class2)	
	Interfaces	UART, USB, SPI	

BT-3000 Sensor Specifications

Sensor specifications			
Types	Temperature sensor (two types)	Temp. measurement (SMD type, Semiconductor type)	-40° ~ 120°
	Infrared sensor (two types)	Transmitter / Receiver type, Detection type	5 ~ 20 [μm], within 3 [m]
	Touch sensor	Application to Security	Response immediately
	Ultrasonic wave sensor	Application to Security	Within 10[m]
	Gas sensor	Application to Home automation	CO2 or Alcohol
	Humidity sensor	Application to Home automation	0 ~ 100 [%]
	Pressure sensor	Application to Security	10 [psi]

BT-3000 Controller Specifications

Controller Specifications	Chipset	PIC16F877 or F74	
	Speed	4 [MHz] ~ 20 [MHz]	
	Interfaces	UART, I2C, SPI	
	Functions	Interrupt, A/D converter, Timer	



BLUETOOTH Embedded Headset Kit

Model: BEHK-100



BEHK-100 Features

Experiment for the Commercial Product developing process. Using Commercial software program released with products. Hands on practice for the program coding.

BEHK-100 Functions

- Provide three experiment contents
 - Volume control
 - Audio control
 - LED control
- Manufacturing experiment of a Kit
- Learn program usage and coding
- Application experiments and answers are supplied

BEHK-100 Contents

I. Embedded Software Setup Guide

1. Introduction
2. Software Setup
3. Compile and Download
4. Persistent Store Setting
5. Cygwin Commands

II. Software Application Handbook

1. Introduction to Bluetooth Embedded Headset
2. Exercises
3. Relevant Library Manual
4. Glossary

III. Application Exercise Answers

Answers

IV. Users Manual



BEHK-100 Components

• Headset board	1EA	• Aluminum Case	2EA
• Audio gateway board	1EA	• Ear sets	2EA
• Battery	2EA	• SPI cable	1EA
• USB charging cable	2EA	• Audio cable	1EA
• Install CD	1EA		

BEHK-100 specifications

Bluetooth Chip set	CSR (BC02-External)
Standard	Bluetooth V1.1
Operating range	10m (Class 2)
Frequency	2.4 GHz
Profile	Headset and Audio gateway
Firmware	Ver 1574

H Stereo Earset /
H Stereo Gateway
00 / MBS-110

You can enjoy wireless phone call and music with MBS-100 connected to BLUETOOTH embedded cell phone.

* Maximum transmission distance between earset and cell phone or gateway can be changed by environment and machinery used.



- Experiments on hardware manufacturing
- Support phone call while listening to music
- music start/ pause/ stop/ rewind/ forward functions
- Accept/ hang up/ rejection / redial functions in phone call
- Alarm rings when battery charging is needed

Components	Standard
BLUETOOTH standard	Ver 1.2
Supported profile	head set, hands free, audio transmission, audio remote control profile
Using frequency	2.302~2.408[GHz]
Transmitting power	0.25~2.5[mW]
Receiving sensibility	-83 [dBm]
Using distance	in 10[m]
Music play back time	9 hours
Talk time (phone call)	11 hours
Standby time	150 hours
Full-charge time	2 hours
Weight	38g
Dimension (W*H*D)	54*28*12 [mm]

- Body 1EA
- USB charging cable 1EA
- Instruction 1EA
- Manual 1EA

- Body 1EA
- USB charging cable 1EA
- Connection cable 1EA

- Experiment on hardware manufacturing
- Real time music play back by using BLUETOOTH
- High quality music play back (BLUETOOTH standard SBC and MP3 supported)
- Provide long time use (Music play back time : 9 hs, Talk time 11hs, Standby time 150hs)
- Rechargeable battery
- Can be connected to various audio sets through stereo gateway
- Buttons designed for user's convenience
- Free from interfering waves Center

A group of Ubiquitous Home Network Training System

BHN-1000 / BCT-100 / UHN-3000

UHN-5000

These equipments are sweet home network practice system including various wire/wireless control. Also, basic experiment on basic control and communication are available in many ways.

Applied demo system of commercial product control



UHN-5000

Wire/wireless control and communication techniques



UHN-3000

Embedded processor control and communication techniques



BHN-1000, BCT-100

BASIC Home Network Trainer

Model: BHN-1000

BHN-1000 is an experimental equipment to educate Basic Embedded system including C-language Programming and Control, connected with Sensors & Commercial products.



BHN-1000 Features

1. BHN-1000 equipment use ATMEGA-128 MPU (low-Power, high-performance). User can study micro-processor Programming, embedded I/O control and RS-485, RS-232C, Ethernet communication programming.
2. BHN-1000 designed to help embedded programming study. This equipment have many interesting devices to use. (2-line text LCD, LED, Buzzer, Thermometer, EEPROM etc..) And this equipment have external 32Kbytes SRAM, so users doesn't need to worry about large program.
3. BHN-1000 supports many ports, so user can use any-type of sensors or actuators. BHN-1000 have analog 4 channel, (8 ports), digital 16bit output port, digital 8bit input port, high-performance 8 relay ports.
4. User can study specially about the digital communication subject (data encryption/decryption, error-recovery algorithm, communication network methodology,) by connecting the BHN-1000 to BHN-1000 or BHN-1000 to other communication equipment.
5. LABview Communication & Control Practice. **[option]**

BHN-1000 Training Contents

PART 1. Introduction of System

- Chapter 1 Introduction of BHN 1000 practice
- Chapter 2 Installation and use of BHN 1000
- Chapter 3 Introduction of how to use AVR studio

PART 2. Basic Practice

- Chapter 4 ATMEGA128 C Programming Basic practice
- Chapter 5 Text LCD Programming practice
- Chapter 6 Keypad Programming practice
- Chapter 7 Thermometer I/O Programming practice
- Chapter 8 EEPROM Programming practice

PART 3. Control Practice

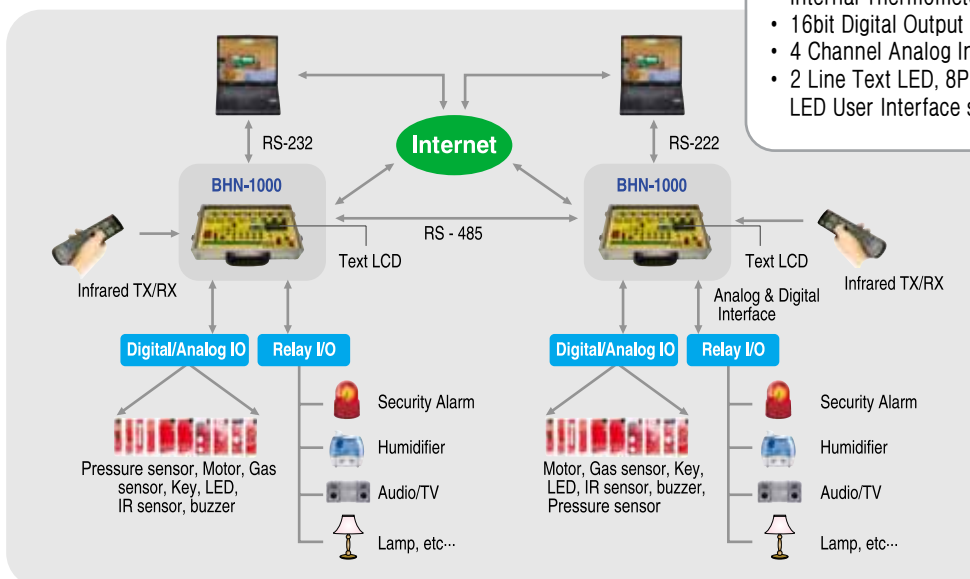
- Chapter 9 Digital Display Programming practice
- Chapter 10 Digital Input Programming practice
- Chapter 11 Analog Input Programming practice
- Chapter 12 Relay Control Programming practice
- Chapter 13 Infrared RX/TX Programming practice

PART 4. Communication Practice

- Chapter 14 RS-485 Communication Programming practice
- Chapter 15 Ethernet Communication Programming practice

BHN-1000 Functions

- Wired communication with
 - RS-485, Ethernet
- RS-232C PC monitoring functions
- Remote control functions by Infrared RX/TX
- 220V AC, 24V DC On/Off control by Relay port
- 1M bits EEPROM support
- Internal Thermometer
- 16bit Digital Output , 8bit Digital Input ports
- 4 Channel Analog Input (ADC included)
- 2 Line Text LED, 8Push Keys, Buzzer, LED User Interface support



BHN-1000 Specifications

Items	Specifications
MPU	ATMEGA128 16Mhz 8bit MPU (32K External SRAM)
Telecommunication	RS-232C (Monitoring) RS-485, Ethernet (Communication)
User Interface	2 Line Text LCD 2 LED 8 Push Keys 1 Buzzer
I/O Ports	16 bit Digital Output Port 8 bit Digital Input Port 4 Channel Analog Input (ADC Included) 8 Relay Port (220V AC, 24V DC 10A) 1 Infrared TX/RX Port
Others	Internal Thermometer 1Mbits EEPROM

BHN-1000 Components

Main Package	Main board	1EA
	12V DC Adapter	1EA
	9V DC Adapter	1EA
Module Package	Pressure Sensor Module	1EA
	Gas Sensor Module	1EA
	Infrared Sensor Module	1EA
	Key matrix Module	1EA
	LED Module	1EA
	Gas Sensor Module	1EA
	DC Motor Module	1EA
	Buzzer/Lamp Module	1EA
	Thermometer Module	1EA
Accessoris	FND(Seven Segment)	1EA
	RS-232C Monitoring Cable	1EA
	RS-485 Communication Cable	1EA

BASIC Communication Trainer

Model: BCT-100

BCT-100 is an experimental equipment to educate Microprocessor, Embedded system, C-language Programming, Control, Ethernet & Network Communication.

BCT-100 Functions

- Wired communication / monitoring
 - RS-485 (2 Channel 4 ports)
 - RS-232C (1 port)
 - Ethernet (1 port)
- Remote control by Infrared RX/TX
- 220V AC, 5V DC On/Off control by Relay port
- 2 bit Digital In/Out port (Direct connection to MPU)
- 2 Channel Analog Input (Direct connection to MPU)
- 2 Line Text LCD, 4 Push Keys, Buzzer, LED User Interface support



BCT-100 Features

1. BCT-100 equipment uses ATMEGA128 MPU (low-power, high-performance). User can study micro-processor programming, embedded I/O control and RS-485, RS-232, ethernet communication programming.
2. BCT-100 is developed to help embedded programming. This equipment has many interesting devices. (2-line text LCD, LED, buzzer, Digital I/O port etc..)
3. BCT-100 supports RS-485/ Ethernet network communication (Client/Server). So user can study many network issues (encryption/error detection and so on..) and network control schemes.
4. Server/Client mode communication (and check status) is possible. Also, user can develop/implement their own character (string, encrypted message) sending program and error correction program.

BCT-100 Training Contents

PART 1. INTRODUCTION OF SYSTEM

Chapter 1 Introduction to BCT-100
Chapter 2 Methods of Installing & Using BCT-100
Chapter 3 How to use the AVR Studio

PART 2. BASIC PRACTICE

Chapter 4 Basic Practice for Atmega128 Programming
Chapter 5 Text LCD Programming Practice
Chapter 6 Keypad Programming

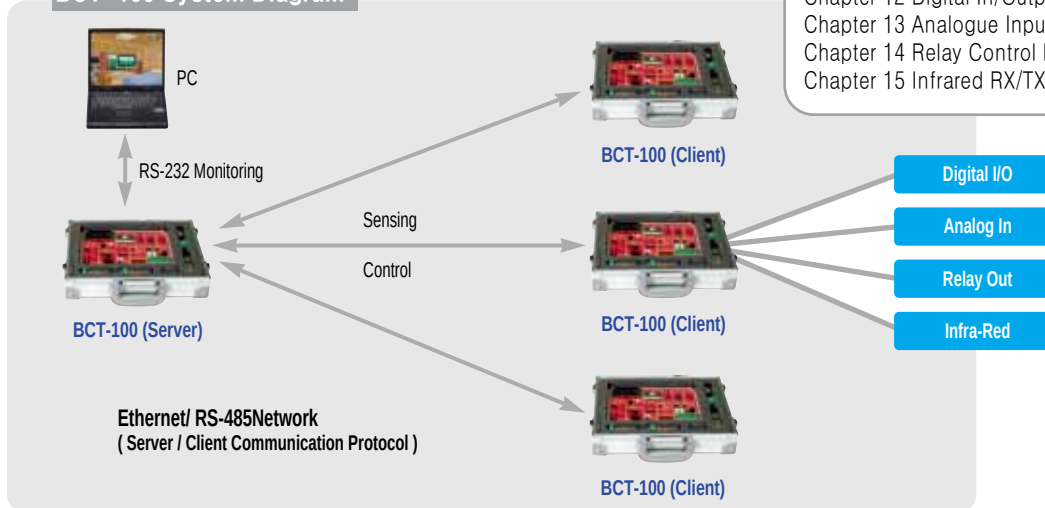
PART 3. COMMUNICATION PRACTICE

Chapter 7 RS-485 Communication Programming
Chapter 8 Ethernet Communication Programming
Chapter 9 Server/Client Network Programming
Chapter 10 Encryption/Decryption Communication Programming
Chapter 11 Communication Error Repair Programming

PART 4. CONTROL PRACTICE

Chapter 12 Digital In/Output Programming
Chapter 13 Analogue Input Programming
Chapter 14 Relay Control Programming
Chapter 15 Infrared RX/TX Programming

BCT-100 System Diagram



BCT-100 Components

Main Package	Main Body	1EA
	220V to 9V DC Adapter	2EA
Module Package	Pressure Sensor Module	1EA – Analog
	Thermometer Module	1EA – Analog
	Infrared Module	1EA – Digital In
	LED Module	1EA – Digital Out
	Buzzer/Lamp Module	1EA – Relay
Accessories	RS-232C Monitoring Cable	1EA
	RS-485 Communication Cable	1EA
	AVR-JATG	1EA

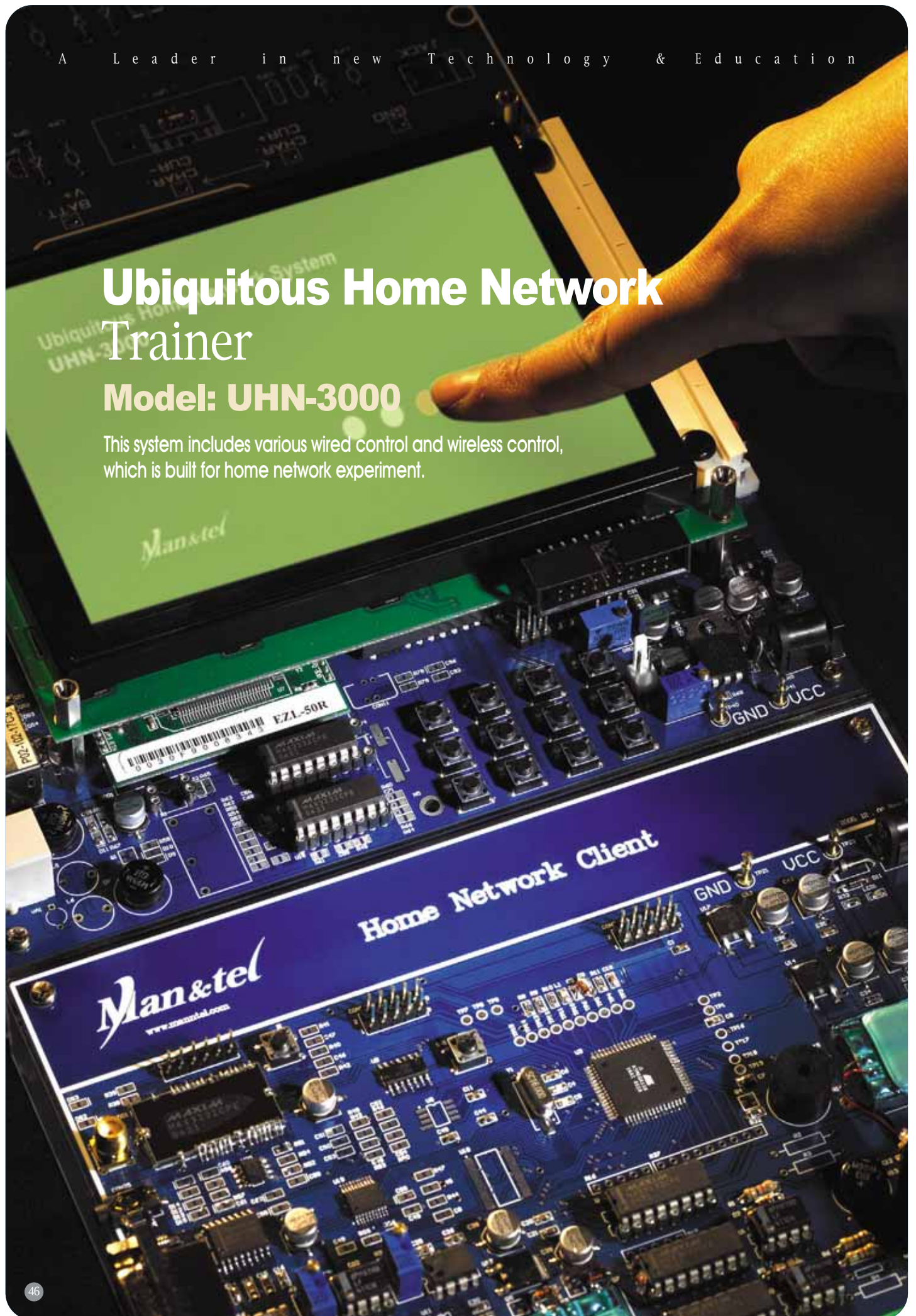
BCT-100 Specifications

Items	Specifications
MPU	ATMEGA128 16MHz 8bit MPU
Telecommunication	RS-232C (Monitoring)
	RS-485, Ethernet (Networking)
User Interface	2 Line Text LCD
	4 LED
	4 Push Key
	1 Buzzer
I/O Ports	2 bit Digital I/O Port
	2 Channel Analog Input
	2 Relay Port (220V AC, 5V DC 1A)
	1 Infrared TX/RX Port
Others	External Communication Selectors (Baud rate selection/LAN-UART selection dip-switch,)

Ubiquitous Home Network Trainer

Model: UHN-3000

This system includes various wired control and wireless control,
which is built for home network experiment.



UHN-3000 Features

This U-Home Network system, which uses wireless technology, is completely different from those products with wire-based technology.

Wireless technologies embedded such as Bluetooth, IR and etc, in the equipment and Ethernet communication (wired and Wireless) technology is added on for network communication. It also includes wire-based control by using PLC, which enables real-time control of the system.

Since various number of controllers can be added and controlled easily by flexible design, this equipment can be used in various field from home use to industrial use. Students will be provided with practical and ideal education system from this home network system trainer.



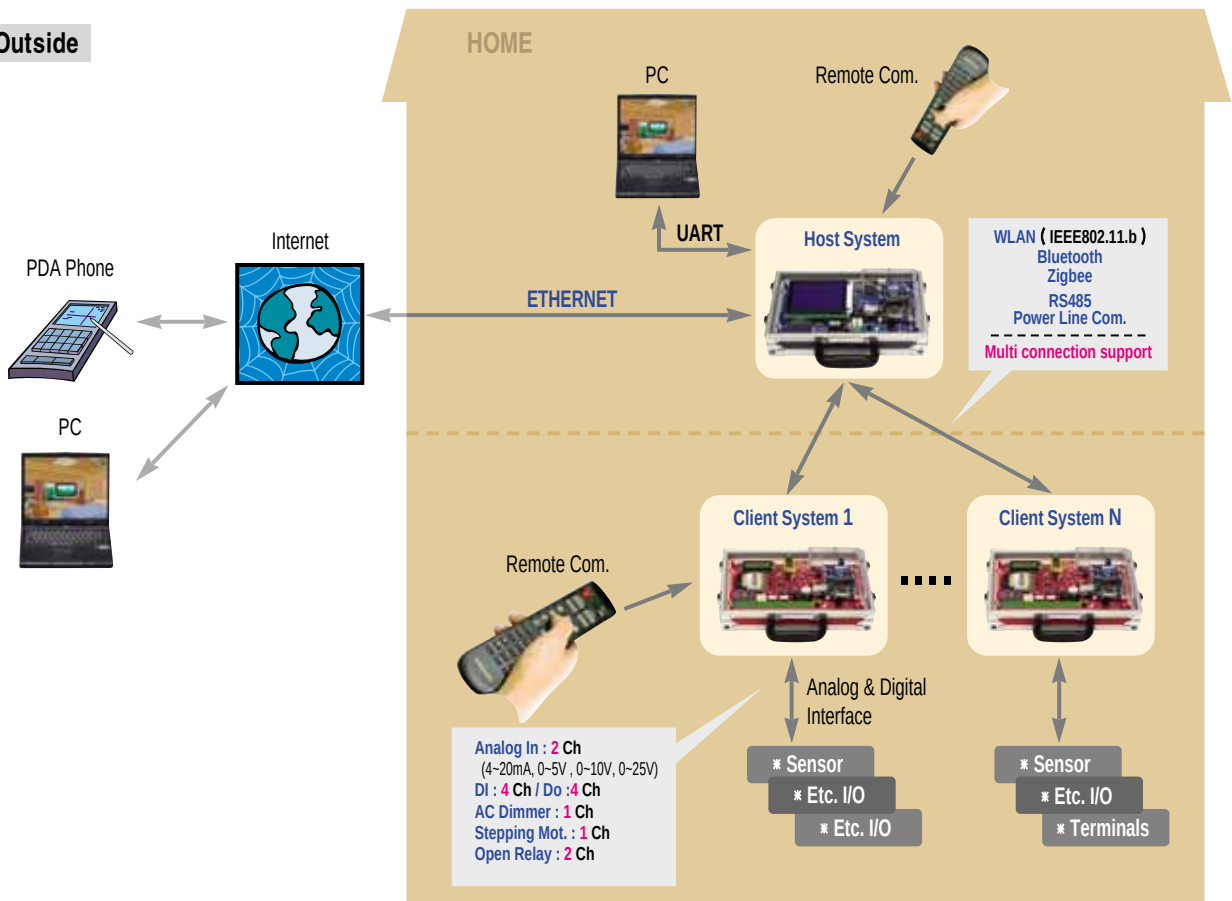
UHN-3000 Functions

- Wireless control function with
 - Bluetooth technology
 - Wireless LAN
 - IR[Infrared] technology
- Network control ability through Ethernet
- Wire-based control ability through PLC
- Illumination control ability (It provides dimming)
- Remote control ability of curtain and blinder
- Control terminals are embedded system structure
- Security control
 - Guarding ability from robbery
 - Guarding ability from fire
- Information collecting ability through various industrial sensors

Ubiquitous Home Network Trainer Model: UHN-3000

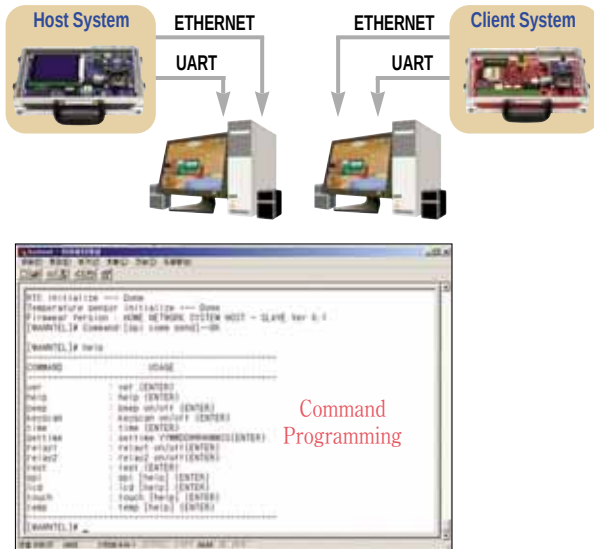
It helps students to learn how to control home appliances and communication appliances and security in real time control.

Outside



Training Contents

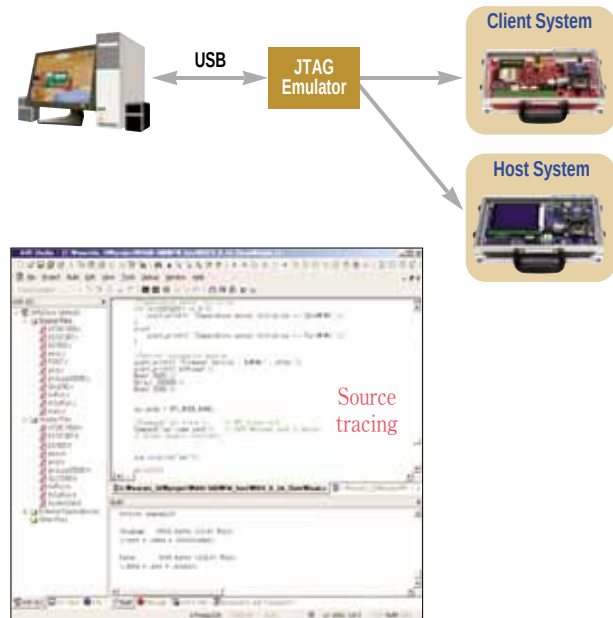
1. System Control practice by the command



Command Practice for Home network Control

1. For users who does not know C programming
=> Users does not need to know C programming for control UHN-30000 I/O module and sensors .
UHN-3000 support command control mode via UART/Ethernet.
2. If user know C programming, he can control UHN-3000 I/O module and sensor by Programming using C, C++.

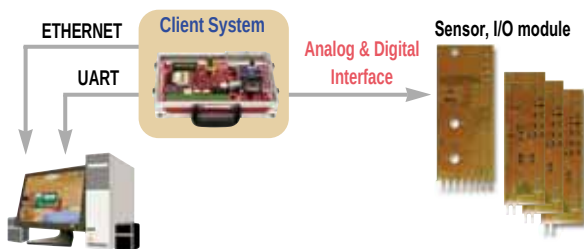
2. Programming practice



Convenient IDE (Integrated Development Environment)

1. UHN-3000 use ATMEGA128 for main CPU. And this company support free IDE(AVR Studio) for ATMEGA users. So there is no additional money for development environment.
2. AVR Studio 4 is world-wide and stable IDE.
Users can adapt this knowledge to industrial field.

3. Interface / Terminal control practice sensor / module manufacturing practice



Various module interface support

Slot type sensor/actuator modules(analog input, motor, AC lamp, digital I/O) can be tested and controlled by program. User can study about this H/W and modules.

4. GUI practice



Graphic User Interface Program Support

1. By UHN-3000 GUI Program (need Windows 2000 or more version), user can control UHN-3000 system. (I/O and actuator)
2. This program is for low-level student or UHN-3000 demonstration purpose.

5. UHN-3000 Training Contents

Ubiquitous Home Network System Practice

1. Introduction to UHN-3000 Test system
2. Understanding Home network process and Practicing its operation
3. Practicing Home network Digital data output
4. Practicing Home network Digital data input
5. Understanding and Practicing the principles of analog sensor operation
6. Understanding and Practice of the operating principle of relays
7. Understanding and Practice of the operating principle of temperature sensor
8. Understanding and Practice of the operating principle of stepping motor
9. Understanding and Practic for power/current control
10. Applications of remote control of home appliances
11. Practice of Home network RS-485 communication
12. Practice of Home network PLC
13. Practice of Home network Bluetooth / Zigbee communication
14. Practice of ARS(Auto response system) Remocon
15. Appendix. Guides to UHN-GUI Installation and Operation
16. Appendix. UHN Communication Protocol

Micro-processor Programming Practice

1. Introduction to UHN-3000 Test System
2. Understanding Home Network Processes and Practicing Its Operation
3. Building up development environment (AVR Studio)
4. Practicing of compiling/linking with development environment (AVR Studio)
5. Practicing of Program Downloading and Debugging
6. Practicing Program of command with hyper terminal
7. Practicing Controlling ATMEGA128 Microprocessor I/O Port
8. Serial Programming-2 USART Port
9. 12C Communication Programming
10. Programming for Processing External Interrupt (EINT)
11. Practicing Programming for data/address bus control
12. Practicing Text LCD Programming
13. Timer and Counter
14. Control with Stepping Motor Using Timer
15. AC phase control with a ATMEGA128 timer
16. EEPROM Programming
17. Wireless LAN communication with serial-wireless LAN module



6. UHN-3000 Components

Dir	Component name	Q Ty	Remarks
Basic	Host system	1	
	Client system	1+ α	α = optional Sales
	Digital Input module	1	
	Digital Output module	1	
	Stepping Motor module	1	
	DC motor module	1	
	Gas sensor module	1	
	Motion detector sensor	1	
	Lamp module	1	
	Infra-Red sensor I	1	Reflection type
	Infra-Red sensor II	1	switch type
	Temperature sensor	1	
	Buzzer / Lamp module	1	
	Pressure sensor	1	
Option	Universal board, parts	N	for madule manufacturing
	AVR JTAG	1	



Host System



Client System

7. UHN-3000 Specifications

Host System	Communication	Bluetooth / Zigbee
		Wireless LAN
		PLC
		RS-485
		Ethernet: 10Base-T
	User interface	UART: RS-232C (115,200bps)
		IR In/Out 1ch
		Graphic LCD(320*240)
		Touch Screen Control
		Full Duplex Audio path
Others	Temperature Sensor	
	Alarm Control 2ch	

Client System	Communication	Bluetooth / Zigbee
		UART:RS-232C (115,200bps)
		IR In/Out 1ch
		Wireless LAN
		PLC
	Data Collection and Control channel	RS-485
		Single Endded 4ch or Differential 2ch
		4~20mA Current loop 2ch
		Open Relay 2ch(8A AC250V)
		Digital in 4ch (Photo Isolation)
		Digital out 4ch (Photo Isolation, Open collector)
		AC ON/OFF Dimming 1ch
		Unipolar Stepper Motor 1ch
		(Max Load Supply Voltage 46V, Max Output Current 3A)

Ubiquitous Home Network Demo System Model : UHN-5000

UHN-5000 Demo Functions

01. Audio (Remote control) : On/Off, Volume Up/Down
02. TV (Remote controller) : On/Off, Channel Up/Down
03. Fingerprint scanner (Remote controller) : Access/Not
04. DoorLock (Remote controller) : Open/Closed
05. Microwave oven (BHN relay) : On/Off (Led display)
06. Humidifier connection
07. AC incandescent stand (Phase control) : Brightness control
08. Body sensor (Digital in) : If human body is sensed, warning light turns on and SMS transmitted
09. Blind (Remote controller) : open/close /Blind angle control
10. Press sensor (ADC) : If human body is sensed, alarm rang and SMS transmitted (Operated in Outdoor mode of menu)
11. Gas sensor (Digital in) : If gas is sensed, warning light turns on and gas valve locked
12. Gas valve : Locked/Unlocked
13. Warning light : On/Off
14. PC for internet : Remote host control (Control by using command mode)
15. PC for control : Internal control by using UHN GUI program (TV/ audio/ blind)

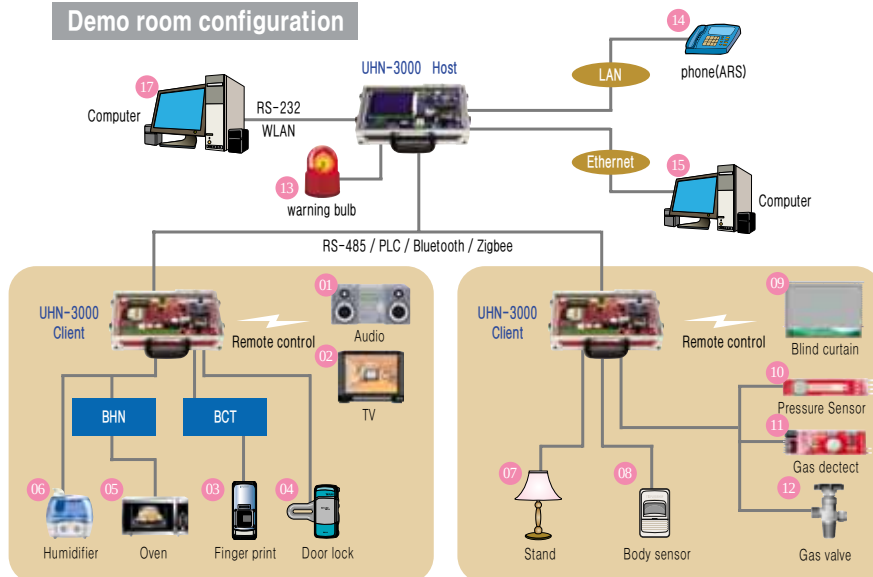
Features of UHN-5000

- Understanding Ubiquitous network system
- Acquisition of wire/wireless control techniques
- Acquisition of embedded programming techniques
- Acquisition of sensor control, motor control techniques
- Acquisition of Power control techniques
- Understanding operation of home appliances
- Understanding home network protocol
- Home network installation and acquiring its operating techniques

Text book of UHN-5000

Text book of UHN-5000 contains commercial product control in addition to the contents of UHN-3000's Textbook

Demo room configuration



Construction of home network demo room containing house appliance, communication devices and sensors is available. And center-controlling function of terminal is supported



Components of UHN-5000

components can be added or removed by user's demand

Classification	Use	Number	Note
Standard feature	Host system	1	
	Client system	1 + α	α = optional to purchase separately
	Digital input module	1	
	Digital output module	1	
	Stepping motor module	1	
	DC motor module	1	
	Gas sensor module	1	
	Motion detection	1	
	Lamp module	1	
	Infrared rays module I	1	
	Infrared rays module II	1	Reflector type
	Temperature sensor module	1	Switch type
	Buzzer & Lamp sensor	1	
	Pressure Sensor Module	1	
Options	TV, audio, aircon, door lock		
	lamp, computer	N	Available to select
	other house appliance		

Above components construct system including UHN-3000 and commercial house appliance

A group of Ubiquitous Sensor Control Trainers

**ZT-200 / USC-5000 / USC-7000 /
USN -1000**

This equipment is based on bluetooth and zigbee technology. It provides instructions on techniques used in future home networking, ubiquitous, telematics and industrial setting management through various experiments on applied area of sensor, motor and power.

USN Trainer



USN -1000

Wireless sensor control system



USC-7000

Equipment for experiment on wireless sensor control



USC-5000

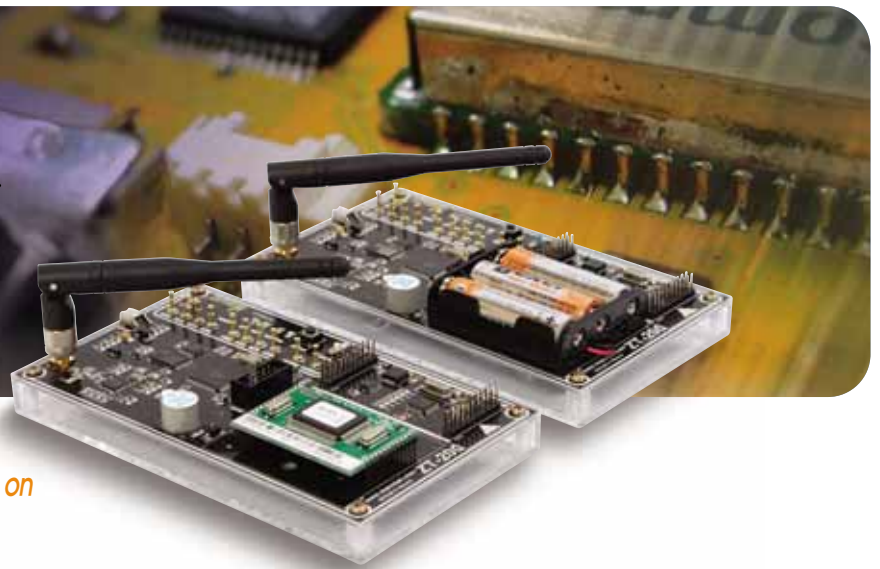
Equipment for experiment on Zigbee wireless communication control



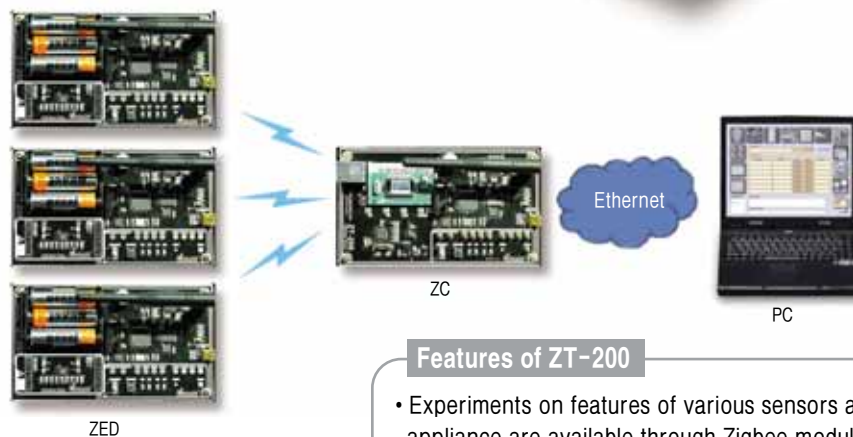
ZT-200

Zigbee Trainer

Model: ZT-200



ZT-200 provides experiment on Zigbee communication and sensor network based on Zigbee combined with various sensors



Features of ZT-200

- Experiments on features of various sensors and control of house appliance are available through Zigbee module
- Experiment on sensor network through Zigbee module is provided
- Various Expansion through expansion ports is available
- Experiment environment is constructed in low price by using free compiler

Contents of ZT-200 text book

Part 1. Introduction to Zigbee technology

- Chapter 1. Introduction to Zigbee
- Chapter 2. Zigbee technology
- Chapter 3. Setting up hardware environment
- Chapter 4. Installing and running software

Part 2. Practice environment of Zigbee system

- Chapter 5. Loading and debugging
- Chapter 6. Running demo program
- Appendix : Demonstrating Zigbee node system which is an embedded system and runs on AVRStudio environment

Part 3. Zigbee system basic programming practice

- Chapter 7. Programming using RTOS
- Chapter 8. LED operation practice using RTOS
- Chapter 9. Handling sensing data by using RTOS

Part 4. Middleware application programming

- Chapter 10. Understanding embedded basic programming
- Chapter 11. Physical layer programming practice
- Chapter 12. MAC layer programming practice
- Chapter 13. Network layer programming practice

Part 5. Encryption practice

- Chapter 14. Reading sensing data in embedded system
- Chapter 15. Reading sensing data in server system

Functions of ZT-200

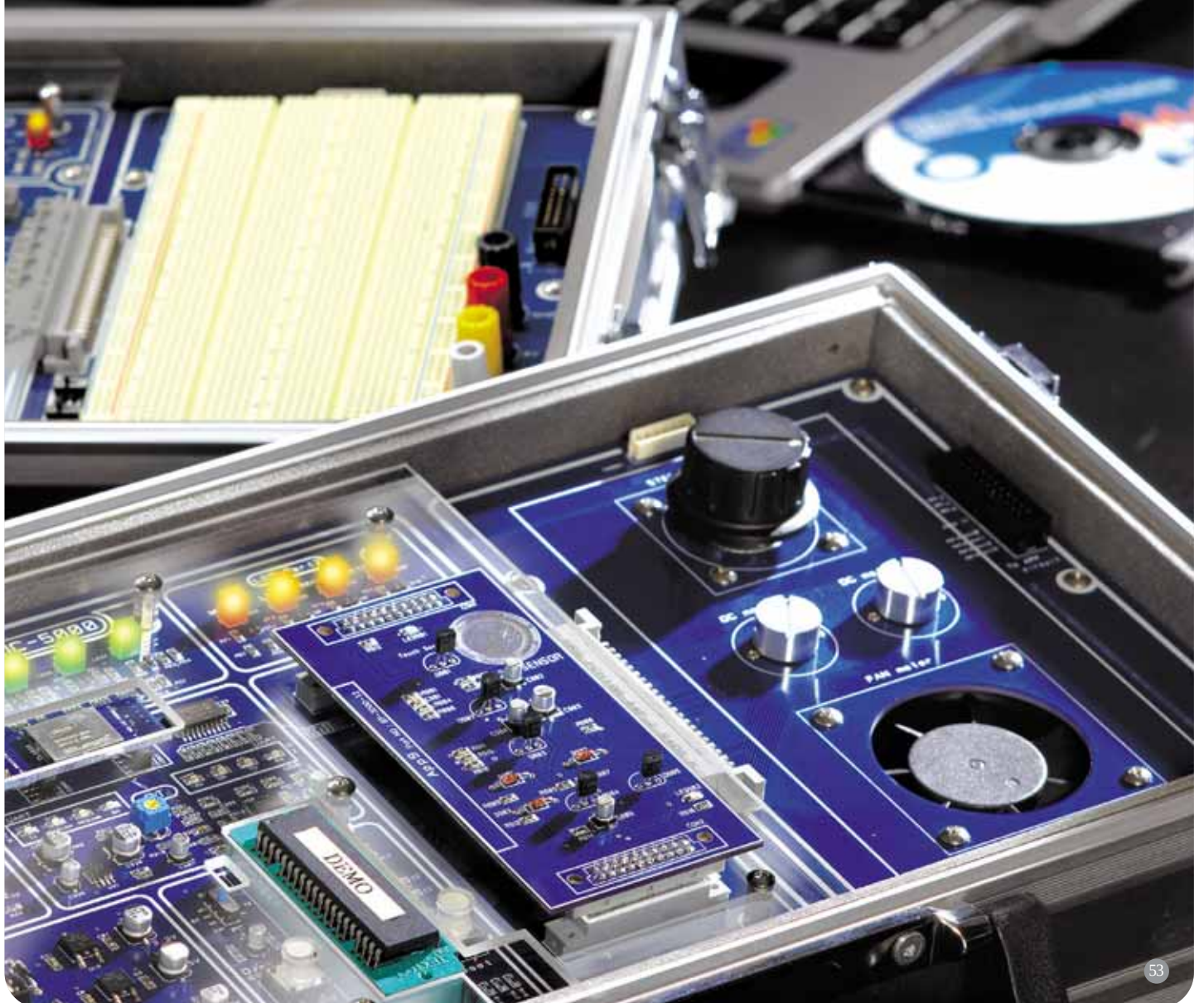
- Experiment on communication using Zigbee
- Instructions on 802.15.4 MAC
- Experiment on embedded programming
- Saving data - 1Mbit EEPROM provided
- Experiment on terminal using USB
- Experiment on various kinds of sensors

Standard of ZT-200

Classification	Standard
MPU	ATMEGA128 8MHz 8bit process
Means of communication	USB
Input/output port	Expansion of Address and data bus
	GPIO
	ADC
The others	USB 2.0
	Speaker
	LED
	Charge circuit
Sensor	Acceleration sensor
	Earth magnetic field sensor
	Relay
	Pressure Sensor
	Temperature sensor
	Infrared rays sensor

A Leader in new Technology & Education

Ubiquitous Sensor Control Trainer Model: USC-5000





USC-5000 Training Contents

1) Slave Contents

Part I. Introduction Wireless

- Chapter 1 Introduction to Ubiquitous Wireless Control System(USC-5000)
- Chapter 2 Understanding of the PIC Microcontroller
- Chapter 3 Understanding of the Server program and Technology of its operational principle
- Chapter 4 Understanding of the Bluetooth Technology

Part II. Basic Wireless

- Chapter 5 Inquiry response to wireless equipments
- Chapter 6 Connection to wireless equipments
- Chapter 7 Wireless Data / Voice Communication
- Chapter 8 Disconnection to the wireless equipments

Part III . Experiment Wireless Application

- Chapter 9 Remote DC / Step motor control
- Chapter 10 Remote Power / Current control
- Chapter 11 Remote Temperature sensor control
- Chapter 12 Remote Infrared sensor control
- Chapter 13 Remote Touch sensor control
- Chapter 14 Remote Ultrasonic sensor control
- Chapter 15 Remote Gas sensor control
- Chapter 16 Remote Humidity sensor control
- Chapter 17 Remote Pressure sensor control

1) Master Contents [Option : additional payment]

Section I. Introduction

- Chapter 1 Introduction to Ubiquitous Wireless Control System (USC-5000)
- Chapter 2 Server program Installation and Operation Theory
- Chapter 3 Understanding Bluetooth Technology

Section II. Basic Exercises

- Chapter 4 Master Information confirmation Exercise
- Chapter 5 Slave Device Inquiry Exercise
- Chapter 6 Wireless Connection Exercise
- Chapter 7 Voice Connection Exercise
- Chapter 8 Voice Connection Termination Exercise
- Chapter 9 Data Connection Termination Reception Exercise

Section III. Wireless Application Exercises

- Chapter 10 Data Reception Exercise
- Chapter 11 Wireless Network Setup Exercise

USC-5000 Features

USC-5000 is similar features to BT-3000 but more compact and slim in design.

Bread board is added on to the Master hardware as an additional feature. This will enable students to design and program control modules on the board. We also added Master contents as an optional purchase. CD and Textbook is supplied for 1:7 network experiment with the option.

USC-5000 Components

Main package

Master + Application B d	1EA
Slave + Motor B d	1EA

Module Package

DC Motor control module	1EA
Step Motor control module	1EA
Current control module	1EA
Light control module	1EA
Temperature sensor control module	2EA
Infrared sensor control module	2EA
Touch sensor control module	1EA
Supersonic control module	1EA
Gas sensor control module	1EA
Pressure sensor control module	1EA
Humidity sensor control module	1EA

Accessories

Demo Processor PIC16F8772	1EA
Practice Processor PIC16F877	2EA
Power Adaptor (Output : 12V,1.5A / Input : 50/60Hz)	2EA
USB Cable	1EA
UART Cable	1EA
SPI Cable	1EA
Carriage & Storage Bag	1EA
6pin Cable	1EA
20pin Cable	1EA
Ear-microphone	2EA
Electric bulb	1EA
Program CD for Slave contents	1EA
Textbook for Slave contents	1EA
Program CD for Master contents [Option]	1EA
Textbook for Master contents [Option]	1EA

Ubiquitous Sensor Control Training System

Model: USC-7000



It can be connected to several clients through one server, and useful (gainful) to build an ubiquitous sensor control experimental lab.

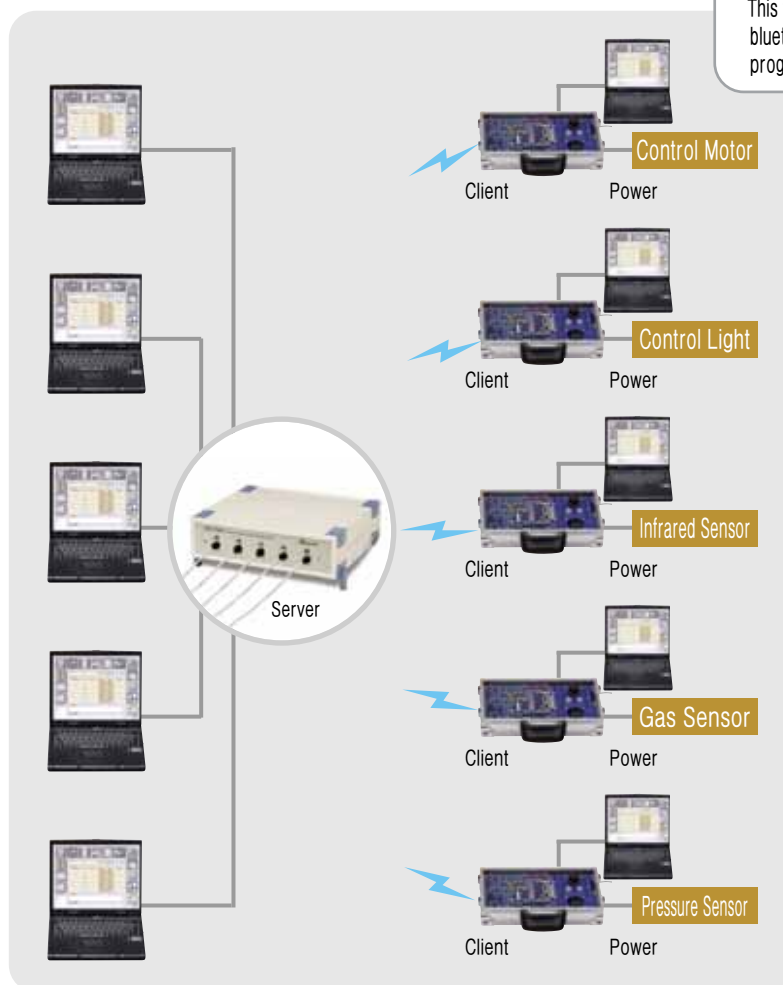
USC-7000 Training Contents

USC-7000 Training Contents is same as USC-5000.

USC-7000 Features

USC 7000 system is composed of one Server(Master) and some Clients(Slave). One Server(Master) has 10 ports to be connected to each computer. One Server(Master) can communicate with 10 Clients(Slave) using 10 computers through one by one matching.

This trainer helps understanding embedded system and 1:7 bluetooth network communication. Students can design and program their own communication program.



USC-7000 Components

Main package

Server	1EA
Clients	N ea(Max.10EA)
Program CD for Clients contents	1EA
Textbook for Clients contents	1EA
Program CD for Server contents [Option]	1EA
Textbook for Server contents [Option]	1EA

Module Package : Same as USC 5000

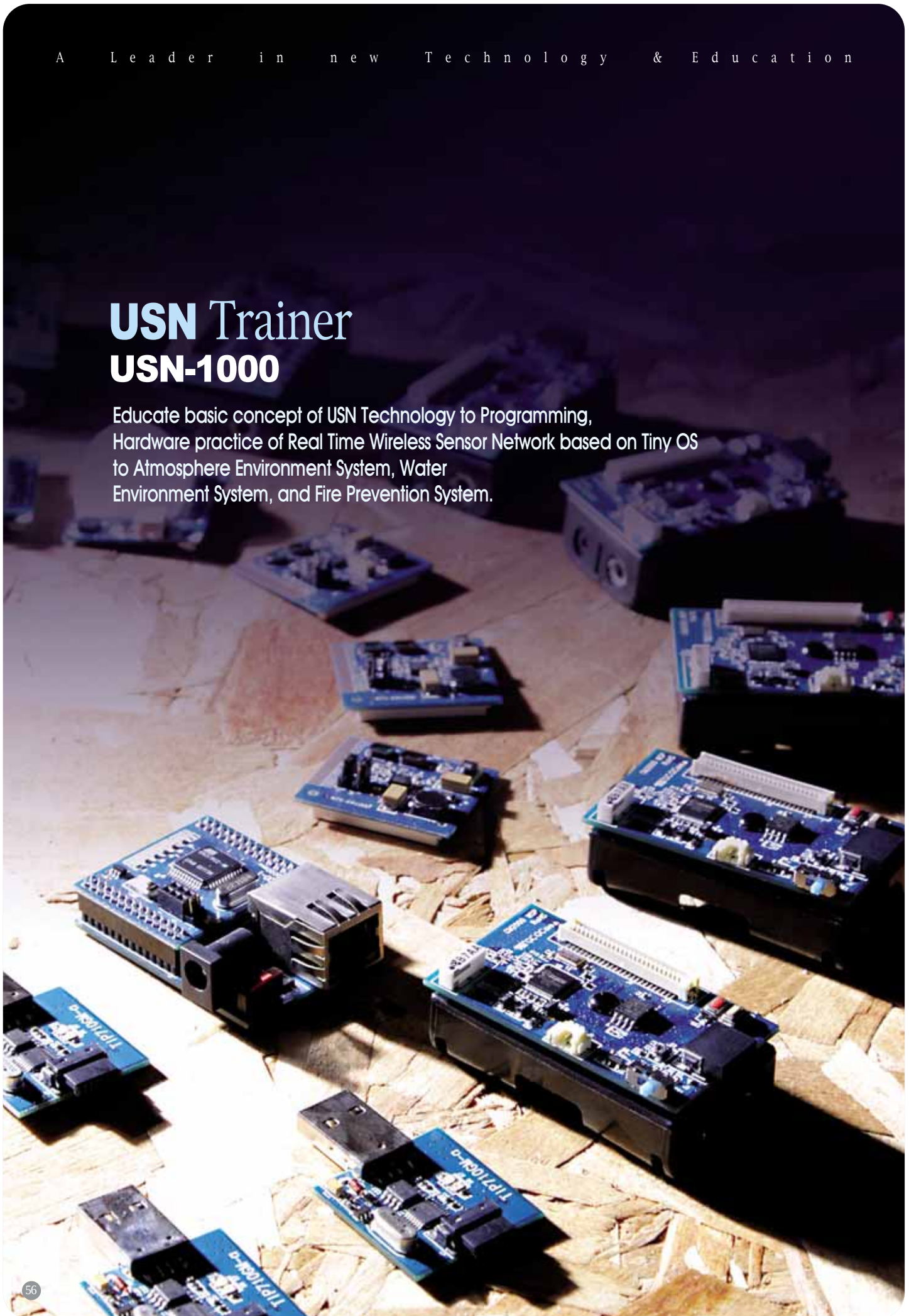
DC Motor control module	1EA
STEP Motor control module	1EA
Current control module	1EA
Light control module	1EA
Temperature sensor control module	2EA
Infrared sensor control module	2EA
Touch sensor control module	1EA
Supersonic control module	1EA
Gas sensor control module	1EA
Pressure sensor control module	1EA
Humidity sensor control module	1EA

Accessories

Demo Processor PIC16F8772	1EA
Practice Processor PIC16F877	2EA
Power Adaptor (output : 12V, 1.5A)	2EA
UTP cable	N EA (Max. 10 EA)
USB Cable	N EA (Max. 10 EA)
UART Cable	N EA (Max. 10 EA)
SPI Cable	N EA (Max. 10 EA)
Carriage & Storage Bag	N EA (Max. 10 EA)

USN Trainer USN-1000

Educate basic concept of USN Technology to Programming,
Hardware practice of Real Time Wireless Sensor Network based on Tiny OS
to Atmosphere Environment System, Water
Environment System, and Fire Prevention System.



USN Trainer USN-1000



USN-1000 Functions

- 1) Understanding USN Basic Principle
- 2) Training USN System Design Technology
- 3) Practice for IEEE802.15.4 Zigbee Communication
- 4) Training 6LoWPAN
- 5) Training Tiny OS Program
- 6) Training Various Sensor Node Practice
- 7) Training Practice for Application
(Monitoring of Various Environment and Water Quality etc.)
- 8) Monitor Programming Function
- 9) Various Platform Function for Data Collector
- 10) Data Processing and Analysis Function
- 11) Various View Programming Function
- 12) Various Sensor Replacement by Function
Change of View Program
- 13) Internet Connectivity Function for Use of DB Server

USN-1000 Components

Name	Model	Q ty	Specifications
USN Communication Node	MTM-CM2000	6	Processor: MSP430 F1611
			Memory: 1MB
			RF Chip: CC2420
			Freq.band: 2.4~2.4835GHz
Sensor Board	MTS-EM1000	3	Transfer rate: 250kbps
			Range: 150m (outdoor), 20~30m (indoor)
			Sensor: upporting Temperature, Light, Humidity, Vibration Sensor
Interface Board	MTS-SE1000	2	LED for Confirmation of Power_Link
	MTI-USB1000	3	Supporting PIR, Magnetic, Microphone
			Interface: USB
S/W CD		1	Data Rate: 560kbps Tiny OS Installation Program Example Program etc.

USN-1000 Features

- 1) By using Commercial USN Communication, Reliability is confirmed
- 2) Using IEEE802.15.4 Layer supporting Zigbee Standard Protocol
- 3) Real Time Wireless Sensor Network Construction based on TinyOS
- 4) Supply Ethernet, USB, Serial Interface Board
- 5) Data Transmission and Reception of 30Mbps Indoor and 150Mbps Outdoor at Maximum Speed using Ceramic Chip Antenna
- 6) Supply Various Sensor Board Optionally(Temperature, Humidity, Light, PIR, Magnetic)
- 7) Supply Interface Board for Sensor Extension
- 8) Supply Powerful USN Monitoring Program
- 9) Supply Sensor Library, Example Source, Technical Document etc., and Assisting Education

USN-1000 Training contents

Part I Introduction of USN and Zigbee Technology

1. Introduction of USN Technology
2. Introduction of Zigbee Technology

Part II Hardware Structure and SoftwarePractice Environment

3. Hardware Structure
4. System Installation of Software

Part III Tiny OS and NesC

5. Tiny OS
6. NesC

Part IV Practice for USN Embedded Programming

7. Demo Operation
8. Practice for Simple Blink Programming
9. Practice for Blink Programming using Timer
10. Practice for Sensor Programming
11. Practice for Sensing Data Display Programming
12. Practice for Transmission and Receiving Programming via Network
13. Practice for Broadcast Programming

Part V Practice of Application

14. Practice for Property Management

A group of Microprocessor Embedded Trainer MBT-100 / MBT-200 / MBPT-1000 / MBPT-2000 / ANDRO-1000

This Embedded training system is used for basic Hardware manufacture & basic CPLD programming and also used for basic Communication & control of various types of Sensors, using Microprocessor.

Embedded
Application Trainer



Andro-1000

PLD Applications Trainer



MBPT-2000

Basic PLD Trainer



MBPT-1000

Microprocessor
Application Trainer



MBT-200

Microprocessor Basic
Trainer



MBT-100

Microprocessor Basic Trainer

Model: MBT-100

MBT-100 is a training system providing hardware manufacturing practices, external module control practices, I/O control practices using microprocessor and practices regarding applications of home security & RFID technology.



Microprocessor Basic Trainer

MBT-100



MBT-100 Training Contents

Part 1. Introduction

- Chapter 1 Introduction to MBT-100 trainer
- Chapter 2 Build up practice environment

Part 2. Basic hardware practices

- Chapter 3 Structure of ATMEGA 128
- Chapter 4 Assembly and operation practice of ISP
- Chapter 5 Assembly and operation practice of RS232
- Chapter 6 GPIO connection and LED operation practice
- Chapter 7 Checking RFID reader's operation
- Chapter 8 Checking text LCD's operation

Part 3. C programming practices

- Chapter 9 Buzzer beep operation practice using IR sensor
- Chapter 10 LCD printing practice using IR sensor
- Chapter 11 Buzzer beep operation practice using Force sensor
- Chapter 12 LCD printing practice using Force sensor

Part 4. Application practices

- Chapter 13 Reading tag information by RFID reader
- Chapter 14 Sensing break-in by IR sensor operation test
- Chapter 15 Sensing break-in by Force sensor operation test

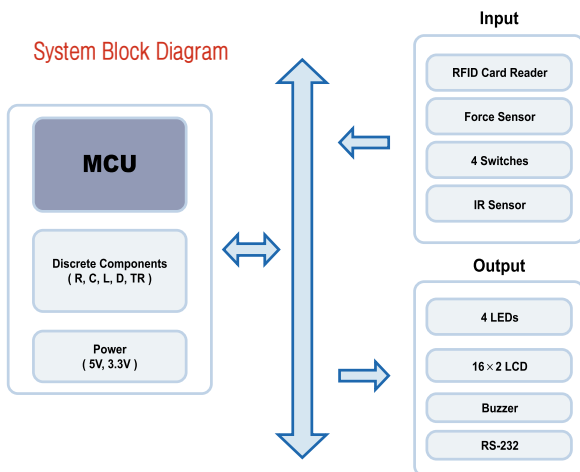
MBT-100 Features

- 1) Provides hardware assembling practices.
- 2) Contains theories and practices.
(ATMEL s ATMEGA128)
- 3) Provides RFID 13.56MHz control practices.
- 4) As sample sources are included in main system, no extra equipment is needed.

MBT-100 Functions

1. Understand Microprocessor Hardware Manufacturing
2. I/O control practice using Microprocessor
3. Home Security & RFID Practice applying Microprocessor

System Block Diagram



MBT-100 Components

Main Board	1 EA
CPU Board	1 EA
RF Board	1 EA
13.56MHz ANT Board	1 EA
ISP Board	1 EA
RS-232C Cable	1 EA
9V Adaptor	1 EA
13.56MHz RFID Card	3 EA
RF Cable 10cm	1EA
Manual book	1EA

MBT-100 Hardware Specifications

Items	Spec
Dimension	202x156(mm)
Communication	Monitoring: Character LCD(16x2), RS-232C Program Download: ISP
Type's Discrete	IR Sensor (Rx: SP23G, Tx: EL23G) Force Sensor (UST-SNR-FSR) ISP(In-System Programming) Dowload RFID 13.56 MHz Tranceiver(TI S6700) RFID Reader(13.56MHz, Long Wire Loop Antenna) RS-232C 9 Pin Connector 16x2 Character LCD Green LED : 4 EA Tact Switch : 4 EA Buzzer : 1 EA
Power	DC 9V/1500mA Adapter
Microcontroller	ATMEGA128-16A(Up to 16MIPS Throughput at 16 MHz) Advanced RISC Architecture Nonvolatile Program and Data Memories 128Kbyte JTAG(IEEE std.1149.1 Compliant(Interface) Operation Voltages: 4.5 ~ 5.5V for ATMEGA128 128K Bytes Flash program memory Internal 8-Channel, 10-bit ADC Internal EEPROM 4Kbytes Internal SRAM 4Kbytes
RF(S6700)	1) 13.56 MHz
RFID Transponder	2) ISO 15693, IOS 14443 supports

Microprocessor Application Training System Model: MBT-200

Microprocessor Application Training System MBT-200



MBT-200 Features

1. MBT-200 is designed as an experiment and practice system for electricity, electronics, computer, communication, and control and is suitable for students beginning with 8bit microprocessor.
2. Character LCD, DC Motor, Step Motor and sensors are employed for training basic functions and programming of ATMEGA128
3. Peripheral device control for each module in C language and board booting and software and hardware debugging using the WinAVR compiler.
4. Experiment and practice for I/O ports for various peripheral devices, Dot Matrix, Step Motor speed, LCD, FND, KEY, sensor, etc.
5. Application project can be designed by selecting a modular combination as Character LCD, DC Motor, Step Motor and sensors are modularized.
6. The textbook is edited and provided in the order of theory, practice and report.

MBT-200 Specification

Part	Specification
MCU	Operating voltage 4.5V ~ 5.5V
ADC	IR/CDS/FRS Sensor
	Volume
CLCD	4bit CLCD
Digital-Out	Buzzer
	LED(4 colors)
	Melody & Speaker
	Magnetic Transducer
	Ultrasonic Sensor
	Pyroelectric Detector
Module	Base
	Module Connect
	USB to Serial
	Dot-matrix
	Dot-matrix x 2EA
	FND
	FND 4EA
	Encoder
	Keypad
	Keypad, Toggle Switch
	DC-Motor
	DC motor, IR Sensor
	Graphic LCD
	Digital Temperature
	Digital Temperature Sensor
	External ADC
	14 bit ADC
	Survo motor
	Survo motor 2EA
	Digital RTC
	Serial Read Time Clock IC
	Step Motor
	Step Motor 2EA
Cable	4-pin, 10-pin, USB mini B
Adaptor	9V

MBT-200 Functions

1. 8 bit microprocessor training and practice system
2. AVR architecture and firmware training and practice
3. Practice of initialization code analysis using the AVR compiler
4. Coding practice using experimental C source
5. Practice using various peripheral devices

Contents of MBT-200 Textbook

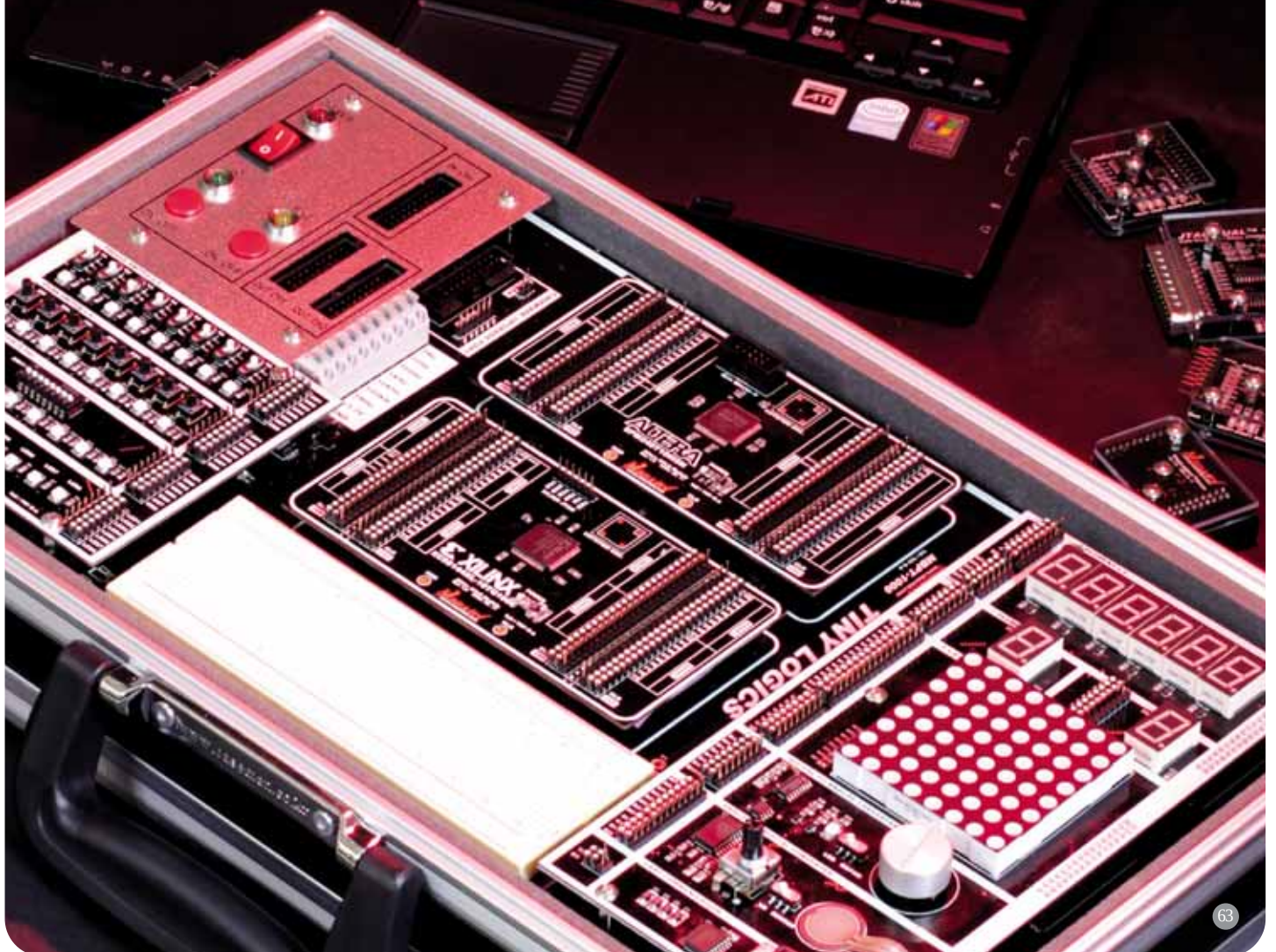
- Chapter 1 AVR(ATmega128) Structure
- Chapter 2 Testing Environment Setup/
Equipment Overview
- Chapter 3 Port Structure and Basic
Operation Practice
- Chapter 4 Port Structure and Basic
Operation Practice
- Chapter 5 Interrupt Operation
- Chapter 6 Timer/Counter Operation
- Chapter 7 LCD control
- Chapter 8 Operation of Serial Cmmunication Port
- Chapter 9 Programming using GPIO
- Chapter 10 A/D Converter Application
- Chapter 11 Motor Control
- Chapter 12 Graphic LCD Control
- Chapter 13 Application Project Design

MBT-200 Components

Component	Spec	Qty
MCU (ATMEGA 128)	Module	1
Application Practice Module	Kinds	14
Step-Motor	EA	2
10-pin Cable	EA	7
4-pin Cable	EA	14
USB mini B Cable	EA	1
Adaptor 9V	EA	1
Textbook	Volume	1
CD	Copy	1

Basic PLD Trainer Model: MBPT-1000

MBPT-1000 is a training system providing basic logic circuit practices, stop watch/DC motor control practices and other practical trainings on Xilinx ISE and Altera Quartus.



Basic PLD Trainer MBPT-1000



MBPT-1000 Functions

1. Users can develop project with various sensor modules and applications.
2. Automatic equipment status checking function
3. Easy monitoring function by supporting USB 2.0
4. Users can connect and control external equipment through extended GPIO pin.

MBPT-1000 Training contents

- Chapter 1** Introduction of MBPT-1000 and PLD
Chapter 2 Construction of Xilinx ISE Developing Environment and Application
Chapter 3 Construction of Altera Quartus developing environment and Application
Chapter 4 Practice of Basic logic circuits
- 1) Basic Gate Experiment
 - 2) Logical experiment
- Chapter 5** Practice of Logic and Arithmetic Circuit
- 1) Full Adder and Full Subtractor experiment
 - 2) 4 bit size Comparator experiment
 - 3) 4 bit size Adder and Subtractor experiment
- Chapter 6** Practice of Data Interface
- 1) 3-State buffer experiment
 - 2) 3*8 Decoder experiment
 - 3) Multiplex experiment
- Chapter 7** Practice of Flip-Flop Resistor
- 1) Flip-Flop experiment
 - 2) Counter experiment
- Chapter 8** Analog Data I/O Practice
- 1) D/A Converter experiment
 - 2) A/D Converter experiment
- Chapter 9** Display Device I/O Practice
- 1) Dot Matrix experiment
 - 2) LED Display experiment
- Chapter 10** Communication Device Practice
- 1) Data communication IC experiment
- Chapter 11** System manufacturing Practice
- 1) Stopwatch
 - 2) Digital Watch
 - 3) Electronic Scales
 - 4) DC Motor Control

MBPT-1000 Features

1. Supports PLD developing environment based on Xilinx ISE (Free of charge).
2. Supports PLD developing environment based on Altera Quartus (Free of charge).
3. Easy to maintain as various I/O practices are modularized.
4. Provides compiling practice without purchasing additional compiler.

MBPT-1000 Specifications

Items	Spec
Main Body	1) Operating voltage : DC 9V 5%
	2) Current Consumption : 600mA
	3) Communication : USB2.0
PLD Board	1) Xilinx : XC95144XL-10TQ100C : DC 3.3V 5%
	2) Altera : EPM240T100I5N : DC 3.3V 5%
I/O Board	1) Switch Board : Push Pull, Toggle, Dip Switch
	2) LED : Red Color LED (8EA)
	3) LED Matrix : 8x8 LED Matrix (RED/GREEN)
	4) FND : 6 FNDs Array, Single FND
	5) DAC : 10bit DAC + LED + DC Motor
	6) ADC : 10bit ADC + Variable Resistor + FSR
	7) Communication : Max3232 + 9PIN DSUB Connector
	8) Bread Board : 165 * 55 * 10 mm
	9) Reference Clock : 1Hz, 10Hz, 100Hz, 1KHz, 100KHz, 1MHz
Adapter	AC 110-220V Free Voltage

MBPT-1000 Components

Items	Q ty	Items	Q ty
Main Board	1EA	DC Adapter	1EA
2 Type CPLD Board(Xilinx, Altera)	1Set	Carry Bag	1EA
10 Type I/Os	1Set	Wrapping Wire	1EA
USB Cable	1Set	Nipper	1EA
RS-232C Cable	1EA	Textbook	1EA

PLD Application Training system

Model: MBPT-2000



MBPT-2000 Functions

- 1) Basic training on FPGA and 7 different peripheral devices.
- 2) Application exercise like wireless RC CAR auto & manual drive mode practice.
- 3) Coding exercise using VHDL
- 4) connection and control of external equipment using extended GPIO.

MBPT-2000 Training contents

- Chapter 1. VHDL basic in-/output
- Chapter 2. AVR in-/output port INTERFACE
- Chapter 3. AVR universal(GPIO) port INTERFACE
- Chapter 4. SERIAL ADC component design
- Chapter 5. Component design of SERIAL ADC using AVR
- Chapter 6. SERIAL DAC component design
- Chapter 7. Component design of SERIAL DAC using AVR
- Chapter 8. Component design of SERIAL communication using AVR
- Chapter 9. Interface of AVR and ultrasonic (SRF04) component
- Chapter 10. Interface of AVR and DC MOTOR COMPONENT
- Chapter 11. Interface of AVR and SERVO MOTOR COMPONENT
- Chapter 12. Interface of AVR and STEP MOTOR COMPONENT
- Chapter 13. VGA COMPONENT design
- Chapter 14. Interface of AVR and VGA COMPONENT
- Chapter 15. RC CAR design using AVR and FPGA

MBPT-2000 Features

- 1) Optimal product to the students beginning FPGA(Cyclone).
- 2) Able to design various components and train components interface as it is interfaced with AVR and FPGA(Cyclone) which is installed to MBPT-2000 main board.
- 3) Providing various peripheral devices and available of various exercises such as DC motor, step motor, ultrasonic sensor & infrared sensor, serial communication, VGA, SW&LED and ADC board.
- 4) Available of wireless RC CAR control using FPGA+AVR.

MBPT-2000 Specifications

Div	Items	Specifications
main	Base	Module Connect
	AVR	ATmega128 / 8bit / operation voltage 4.5V~5.5V
	FPGA	EP1C6Q240 / operation voltage 5V
	RS-232/USB	RS-232 / USB to Serial
	Ultrasonic/IR	SRF05 / ST-23G (RX) / EL-23G (TX)
	VGA	Resolution 800X600
	LEDs/Switchs	LED 8ea / Tact_SW 4ea / Toggle_SW 4ea
	DC MOTOR	20X25mm, ϕ 6.15, DC3V
	STEPPING MOTOR	KH42HM2-901, 1.8'
	ADC/DAC	MCP3208 / ADC0809 / DAC7512
Wireless car	Cable	10pin, 20pin, 30pin, flat cable / socket cable / RS-232 cable / B type USB cable / RGB cable
	Adapter	12V
	Car	Size 1:18 / 314mmX175mmX140mm
	RC_Board	ATmega128 / FPGA / Zigbee module / Character LCD / Ultrasonic sensor / LED
	Controller	Gun type controller
	Control_Board	ATmega128 / Zigbee module / variable resister /
	Battery	7.2V 1A Ni-card battery / AA battery

MBPT-2000 Components

Items	Q ty	Items	Q ty
Base board	1EA	Wireless controllera	1EA
RC-CAR	1EA	7.2V 1A Ni-Cad battery	1EA
Zigbee module	2EA	adaptor	1EA
AA battery	8EA	RS-232 cable	1EA
10P flat cable	3EA	USB cable	1EA
20P flat cable	4EA	RGB cable	1EA
30P flat cable	1EA	CH254S SOKET cable	25EA
program CD	1EA	Carrying bag	1EA
Application exercise module board	9EA		

Embedded Training System

Model: ANDRO-1000


NEW

Features of ANDRO-1000

- An Android development board which perfectly implements an up-to-date tablet environment
- Provide a QR Code text for Android porting and Android App
- Perfect combination of the newest processor and the latest Android version
- Support various multimedia formats to maximize availability
- Support user-focus App creation over wireless network

Functions of ANDRO-1000

- Provide a development environment identical to that for smart phones.
- Flexible input and output through touch screen and sensors
- Execution image download through USB
- Provide 2 Megapixel web camera
- High-density image display through an HDMI Port
- Support all Android-based Apps
- Practice of Android porting (provide source and circuit drawing)
- Practice of Android App (provide source)

Contents of Training

Part 1 Android porting

1. Overview of porting
2. Structure and features of Andro-G5
3. HW develop environment installation
4. Basics of Linux
5. Environment setup for porting
6. u-boot compile
7. Kernel compile
8. Android compile and analysis
9. File download and Andro-G5 operation test

Part 2 App development

1. Introduction
2. Structure and features of Andro-G5
3. Android App program development

ANDRO-1000 Components

Component	Qty	Component	Qty
Case	1 Ea	SD memory (4GB)	1 Ea
Andro-G5 body	1 Ea	DVD	1 Ea
Power cable/adaptor	1 Ea	User manual	1 Copy
USB cable	1 Ea	Android App textbook	1 Copy
Serial USB cable	1 Ea	Android porting textbook	1 Copy
Interface board	1 Ea	GPS	Option
T-Flash (2GB)	1 Ea		

ANDRO-1000 Specification

H/W SPEC	
Items	Specifications
Processor	Samsung S5PC110 (Cortex-A8 1Ghz)
Display	7 TFT LCD, 800 x 480 pixels
Air Interface	WiFi-802.11 b/g/n
Display color depth	24bit/pixel
Multi-touch panel	Capacitive
Primary keypad	Capacitive Touch Standard 3 key : Back, Home, Menu
Bluetooth	2.0 +EDR
USB	Standard USB 2.0 Hosted
Micro USB	Device mode includes charging
Digital TV OUT	Standard HDMI Port
Analog TV OUT	3.5mm Jack (Video RCA / Audio RCA)
Sensor	3-axis accelerometer for UI auto-rotate
Power adapter	Input-100~230vac. Output-5vdc/2A
Built-in Micro SD T-Flash	2GB
SD Card	4GB support up to 32GB
Built-in Flash	NAND 512MB
Camera	2.0MP
Battery Type	Standard Battery, 4000 mAh Rechargeable Lithium-Ion Polymer
GPS	USB Type

S/W SPEC	
Items	Specifications
System software	Kernel 2.6.32, Android 2.2(Froyo)
Media player	MP3/WAV/AAC/AC3/MP4/H.264/MIDI
Streaming media	Supports H.264+AAC based MP4 container format

Renewable Energy Lab Equipment

PCTK-100 / SEGT-1000 / WEGT-1000 (B) / WEGT-1000 (H)

User can learn the knowledge of principles and development system about Solar Power and Wind Power.

Control Practice is possible by separately deviding each Module units. Whole system is configured to control in real-time.

This is the training system which helps to breed up the human resources for the Renewable Energy Industry.

Wind Energy
Generation Training System
(Hand Type)



WEGT-1000
(H)

Wind Energy
Generation Training System
(Blade Type)



WEGT-1000
(B)

Solar Energy
Generation Trainer



SEGT-1000

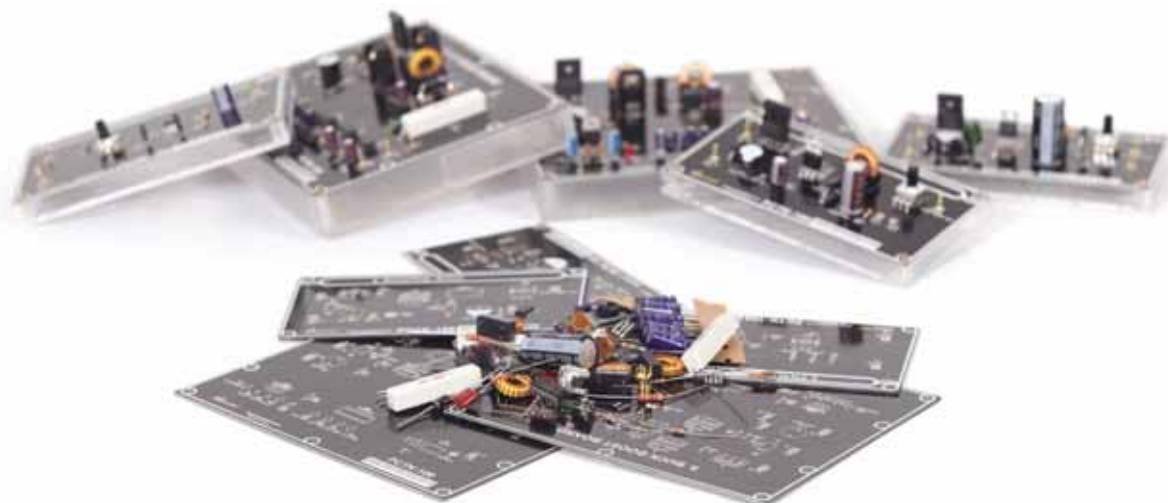
Power Conversion
Training Kit



PCTK-100

Power Conversion Training Kit

Model: PCTK-100



PCTK-100 Features

1. The power conversion module is designed as an experiment and practice system for electronics and is suitable for students beginning with DC-DC Converter.
2. Circuit operation can be understood through manufacturing practice for each module.
3. It is possible to conduct experiment and practice to check change in output voltage of BUCK BOOST and CUK Modules by adjusting PWM Gen output DUTY cycle.
4. The textbook is edited and provided in the order of theory, manufacturing practice and report.

PCTK-100 Functions

1. Education and training system for power conversion
2. Education and training for manufacturing 5 modules
3. STEP_UP DC-DC Converter manufacturing
4. STEP_DOWN DC-DC converter manufacturing
5. BUCK BOOST DC-DC Converter manufacturing
6. CUK DC-DC Converter manufacturing

PCTK-100 Specification

Part	Specification
Module	25KHz 5V output
Specification	Duty Ratio 2~45% ADJ
PWM Generator	SIZE : 150 X 85(mm)
	Input : DC12V
Boost(Step_up)	Output : DC 12~36V ADJ
	SIZE : 150 X 85(mm)
	Input : DC12V
Boost(Step_down)	Output : DC 0~12V ADJ
	SIZE : 150 X 85(mm)
	Input : DC12V
BUCK BOOST (Step up/down)	Output : DC 0~36V ADJ
	SIZE : 185 X 155(mm)
	Input : DC12V
CUK (Step up/down)	Output : DC 0~40V ADJ
	SIZE : 185 X 155(mm)
Cable	SMA CABLE 75MM

Contents of PCTK-100 Textbook

1. Principle of SMPS(Switching Mode Power Supply)
2. PWM Generator Operation and practice
3. Non-isolated Converter, Boost(Step_up) operation and practice
4. Non-isolated Converter : Buck(Step_down) operation and practice
5. Non-isolated Converter : Buck-Boost (Step_up/down) operation and practice
6. Non-isolated Converter : CUK(Step_up/down) operation and practice

PCTK-100 Components

Part	Spec	Qty
Training Module	PWM Generator	Module 1
	Boost(Step_up)	1
	Boost(Step_down)	1
	BUCK BOOST(Step up/down)	1
	CUK (Step up/down)	1
SMA CABLE	EA	1
Textbook	Volume	1

Solar Energy Generation Trainer

Model: SEGT-1000



[Patent Applied No, 10-2010-0134493]

SEGT-1000 Features

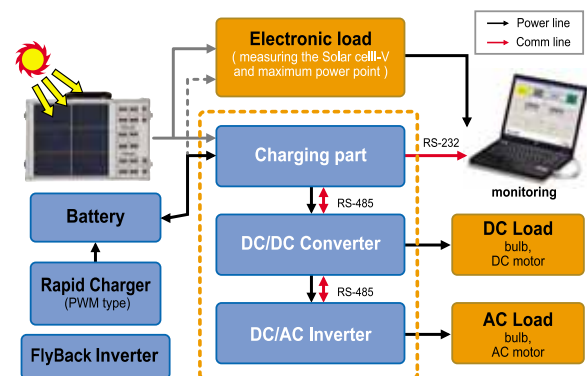
1. Helps users understand solar energy generating system by combining light source, charging controllers, converter, inverter, etc as a module.
2. Provides customized power generation system designing practices for manufacturing commercial products or practical training.
3. Every module is controlled through computer and has test pins for users to measure characteristics of each circuit.
4. Every module can be powered by battery during practices.
5. Power efficiency of each module is displayed on GUI in real time.
6. Incident angle of light source can be changed.
7. Each chapter of text book has objective of practice, theories, practices and report.

SEGT-1000 Training contents

- Chapter 1 Overview and composition of solar energy generation
 - Chapter 2 Types and characteristics of solar cell
 - Chapter 3 I-V characteristics of solar cell
 - Chapter 4 Serial/parreral connection characteristics of solar cell
 - Chapter 5 Understanding PWM control circuit
 - Chapter 6 PWM power control by using microcontroller
 - Chapter 7 Practices about applications of PWM power control
 - Chapter 8 Overview of converter
 - Chapter 9 Designing StepUp converter
 - Chapter 10 Designing StepDown converter
 - Chapter 11 Overview and types of inverter
 - Chapter 12 Designing insulation inverter
 - Chapter 13 Designing not insulation inverter
 - Chapter 14 Overview of charging/discharging system
 - Chapter 15 PC monitoring practice by using GUI /
- Appendix DATA SHEET(LM2576, LM2577, TL494)

SEGT-1000 Functions

1. Understanding structure and concept of solar energy generation system
2. Understanding&designing energy conversion process
3. Understanding structure and principles of various inverters and converters
4. Users can analyze difference in energy generating efficiency according to incidence angle of light.
5. Supports capacity expansion practice through serial/parallel connection of solar cells.
6. Supports tracking system control practices using microprocessor.
7. Beep sounds when connecting module to other module with opposite polarity.



System Block Diagram

RFSG-1000 Specifications

Div	Spec
Solar cell	6V 2.5W(6EA) , tracking system (option)
Light source	500W Halogen lamp
Battery	12V 12Ah Non-leakage and sealed Battery
Charge Controller	DC6-40V ==> DC12V Charge(Step Up, Step Down method) Applied protection circuitry for Overcharge, Over-discharge
Rapid Charger	AC220V DC 15V 2A (PWM method)
DC/DC Converter	DC12V DC230V (PWM method)
DC/AC Inverter	DC230V AC220V (PWM method)
FlyBack Inverter	DC12V AC220V(PWM method)
AC Load	Incandescent lamp, Fluorescent lamp, AC motor
DC Load	LED, DC motor

RFSG-1000 Components

Div	quantity
Main Body	1EA
RS-485 Cable	5EA
USB Cable	1EA
User Guide manual	1EA
Text book	1EA
Firmware CD	1EA
Tracking system	1EA

Wind Energy Generation Training System

Model: WEGT-1000 Blade Type



WEGT-1000 (Blade Type) features

1. Designed to allow indoor experiments for the principle of wind power generation
2. The system is composed of blower, blade, load module, wind speed meter, DC/AC inverter, battery and quick charger
3. For the purpose of safety, load and inverter modules are contained in a steel enclosure
4. Blade support frame is provided to endure the wind pressure when wind is applied to the blade by the blower.
5. Real-time wind speed measurement using a wind speed meter.
6. The load module is equipped with an LCD for real-time checking of blade RPM.
7. The DC/AC inverter module is equipped with an LCD to check voltage and current .
8. Each chapter of the training textbook is composed of theory, practice and report.
9. Manufacturing practice for power conversion and measurement of circuit characteristics

WEGT-1000 (Blade Type) functions

1. Measuring energy vs. number of blades
2. Measuring energy vs. blade angle
3. Measuring energy vs. the speed of blower
4. Measuring blade RPM vs. load
5. Manufacturing power conversion circuit.

WEGT-1000 (Blade Type) Part Specification

Part	Specification
Blower	Rated voltage 220V
	Power consumption: 1060W
	Diameter: 0.5m
Blade	Voltage regulator: Single phase 220V
	Rotation diameter: 07m
	Blade: 12 EA
Generator	Support frame
	AFPM Generator
Load Module	Output : 500W /500RPM
	200V / 50W halogen lamp 5 EA
DC/AC Converter	LCD (RPM Display)
	Input : 80V~150V
	Output voltage: 230VAC
AC load	LCD panel
	AC lamp
Battery	Fan 220VAC/12W
	Rated output voltage : 12V / 12AH
Quick charger	Input : AC220V / 60Hz / 43VA
Wind speed mete	Range: 0~45m/s

Contents of WEGT-1000 (Blade Type) Textbook

1. Introduction to wind power generation
2. Configuration and structure of wind power generation
3. Understanding wind power generator
4. Measuring power generation vs. wind speed
5. Measuring power generation vs. number of blades
6. Measuring power generation vs. blade angle
7. Measuring RPM vs. load
8. Measuring energy generation and energy conversion
9. Power conversion experiment using DC/AC converter
10. PWM generator manufacturing practice
11. BOOST(Step_Up) type manufacturing practice
12. BUCK(Step_Down) type manufacturing practice
13. BUCK_BOOST(Step_Up/Down) type manufacturing practice
14. CUK(Step_Down) type manufacturing practice
15. Trends and forecast of wind power generation

WEGT-1000 (Blade Type) components

Components	Unit	Qty
Blower	Unit	1
Blade & generator	Set	1
Load Module	Module	2
DC/AC inverter	Module	1
Battery	EA	1
Quick charger	EA	1
Wind speed meter	Set	1
Connection Cable	Set	1
Textbook		
Power conversion training kit [Option]	Module	5

Wind Energy Generation Training System

Model: WEGT-1000 Hand Type



WEGT-1000 (Hand Type) functions

1. Measuring generator's 3-phase output energy
2. Measuring generator rotation vs. hand force
3. Power conversion using converter, inverter and load
4. Magnitude of energy generation vs. load
5. Power conversion circuit manufacturing practice

Contents of WEGT-1000 (Hand Type) Textbook

1. Introduction to wind power generation
2. Configuration and structure of wind power generation
3. Understanding wind power generator
4. Measuring energy vs. generation speed
5. Features of generator's 3-phase output
6. Measuring energy generation and energy conversion
7. Power conversion practice using DC/AC converter
8. Power conversion practice using DC/AC inverter
9. Power conversion practice using FlyBack inverter
10. PWM generator manufacturing practice
11. BOOST(Step_Up) type manufacturing practice
12. BUCK(Step_Down) type manufacturing practice
13. BUCK_BOOST(Step_Up/Down) type manufacturing practice
14. CUK(Step_Down) type manufacturing practice
15. Trends and forecast of wind power generation

WEGT-1000 (Hand Type) components

Component	Unit	Qty
Generator	Set	1
Load Module	Module	3
DC/DC converter	Module	1
FlyBack inverter	Module	1
DC/AC inverter	Module	1
Battery	EA	1
Quick charger	EA	1
Connection Cable	Set	1
Textbook		
Power conversion training kit [Option]	Module	5

WEGT-1000 (Hand Type) features

1. Designed to allow indoor experiments for the principle of wind power generation
2. The system is composed of generator, load, DC/DC converter, DC/AC inverter, FlyBack inverter, battery and quick charger
3. For the purpose of safety, load and inverter modules are contained in a steel enclosure.
4. Experiments are conducted under the same environment as wind power generation by applying force to the generator with hand instead of blade in order to exclude noise involved in wind power generation experiments
5. Check real-time power generation vs. hand force
6. Power conversion practice using DC/DC converter and DC/AC inverter
7. Designed to test and check the magnitude of energy generated
8. Each chapter of the training textbook is composed of theory, practice and report.
9. Manufacturing practice for power conversion and measurement of circuit characteristics

WEGT-1000 (Hand Type) Part Specification

Part	Specification
Generator	AFFM Generator
	Output : 500W /500RPM
	Supporting frame
Load Module	Including 3-phase full rectifier
	Input : 19V~36V
	Rated output: 12VDC Output current: 4.2A
DC/DC converter	Input : 12VDC
	Output voltage : 80~150VDC
	LCD panel
DC/AC inverter	Input : 80V~150VDC
	Output voltage : 230VAC
	LCD panel
FlyBack inverter	Input 12VDC
	Output voltage : 230VAC
	LCD panel
DC load	DC lamp
	Fan (DC 12V/1.5W)
AC load	AC lamp
	Fan (220VAC/12W)
Battery	Output voltage : 12V / 12AH
Quick charger	Input : AC220V / 60Hz / 43VA

A group of Basic Electronics Trainer ECTK-100 / BECK-1000 / DCTK-1000

Digital Communication
Trainer



DCTK-1000

Basic Electronic Circuit
Training Kit



BECK-1000

Electronic Component
Training Kit



ECTK-100

Electronic Component Training Kit

Model: ECTK-100

ECTK-100 helps users learn basic theories of electronic components and how to apply them to electric circuits through practical trainings. For the practices, ECTK-100 provides 36-type sample modules and 27-type PCBs for manufacturing practices.

ECTK-100 is composed of 3 parts, and each part handles passive electronic components, active electronic components and sensors.

With theoretical materials of 34-week course text book and practical trainings through kit, ECTK-100 can provide high-efficiency education about electronic components.



Electronic Component Training Kit ECTK-100



ECTK-100 Features

- 1) ECTK-100 helps users learn roles and characteristics of basic electronic components.
- 2) Helps users learn how to apply components with practical trainings.
- 3) ECTK-100 provides 37 sample modules & 27 PCBs for manufacture practice.
- 4) ECTK-100 is composed of 3 parts, which are passive electronic components, active electronic components and sensors.
- 5) Passive electronic components part : resistor, capacitor, inductor, battery, connector, switch, relay, solar cell, motor, microphone, speaker, antenna, PCB, LED&7-segment.
- 6) Active electronic components part : diode, zener diode, transistor, crystal oscillator, microprocessor, rectifiers, SCR, operational amplifier, etc.
- 7) Sensor part : Temperature sensor, humidity sensor, gas sensor, pressure sensor, infrared sensor, human body sensor and tilt sensor.
- 8) There are TEST PINs in each module to measure characteristics of each component-applied circuit.
- 9) Text book carries 34-week course materials composed of theories, practices and reports.

ECTK-100 Training contents

- Chapter 1 Introduction
- Chapter 2 Trend and and forecast of electronic component industry
- Chapter 3 Basics of Resistor
- Chapter 4 Capacity characteristics of resistor
- Chapter 5 Applications of Resistor
- Chapter 6 Basics of Capacitor
- Chapter 7 Applications of Capacitor
- Chapter 8 Basics of Inductor
- Chapter 9 Applications of Inductor
- Chapter 10 Battery
- Chapter 11 Connector
- Chapter 12 Switch
- Chapter 13 Relay
- Chapter 14 Solar cell
- Chapter 15 Motor
- Chapter 16 Mike
- Chapter 17 Speaker
- Chapter 18 Antenna
- Chapter 19 PCB
- Chapter 20 LED & 7segment
- Chapter 21 Diode
- Chapter 22 Zener Diode
- Chapter 23 Basics of Transistor
- Chapter 24 Applications of Transistor
- Chapter 25 Oscillator
- Chapter 26 Microprocessor
- Chapter 27 Rectifier
- Chapter 28 SCR
- Chapter 29 Operational Rectifier
- Chapter 30 Application of Operator Rectifier
- Chapter 31 Temperature sensor and Humidity sensor
- Chapter 32 Gas sensor and Pressure sensor
- Chapter 33 Infrared sensor and Human Detection sensor
- Chapter 34 Tilt sensor



ECTK-100 Functions

- 1) Understand types and characteristics of electronic components.
- 2) Understand the trend of electronic component industry and technology.
- 3) Understand types and characteristics of passive electronic components and do practical trainings
- 4) Understand types and characteristics of active electronic components and do practical trainings
- 5) Understand types and characteristics of sensor components and do practical trainings.
- 6) Compose electric circuits with major electronic components.
- 7) Do measuring practices for electronic components with measuring devices.
- 8) Understand characteristics of basic electronic components for Robots, Embedded systems, and new Renewable energy generating systems.

ECTK-100 Components

Items	Q ty	Remarks
Carrying bag	1 ea	
The finished modules	36 kinds	
Manufacturing PCB board	27	27 kinds
Manufacturing Dipole Antenna	1	
Components for manufacturing PCB board	1 Set	27 kinds
Manual book	1	

ECTK-100 Hardware Specifications

Items	Spec Q ty
Frequency Range	20Hz ~ 6 [MHz]
Input Voltage	DC 3.3~12V
Output Voltage	AC 1V,DC 5V,DC7.2V
Substrate material	FR-4
PCB thickness	1.6 [mm]
Operating Temperature	-20 C ~ 50 C
Relative Humidity	0% ~95%

Basic electronic circuit training kit

Model: BECK-1000

BECK-1000 Functions

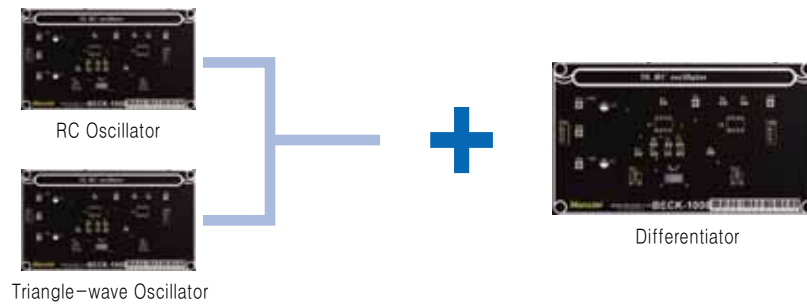
- 1) Comprehensive training on basic electronic circuit modules
- 2) Measuring practice using Electronic Circuits and Power Supply Module.
- 3) Suitable for prerequisite course who major electronic engineering.
- 4) Improve the student techniques in handling the electronic circuits.
- 5) Application practice by each of other module connection

BECK-1000 Features

- 1) provide 25 different modules
- 2) provide Power Supply Module
- 3) TEST Pin on each module boards.
- 4) Advantage using one connection cable between each modules and Power Supply Module.

BECK-1000 Application practice by each of other module connection

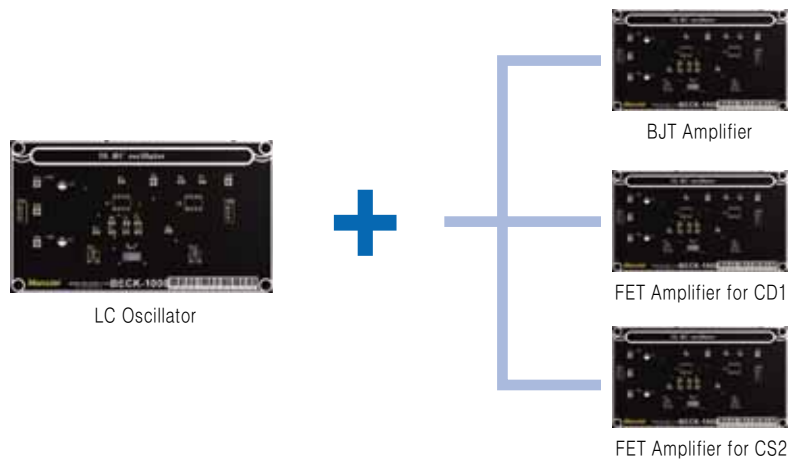
1) RC Oscillator or Triangle-wave Oscillator + Differentiator



2) RC Oscillator + Integrator + Differentiator



3) LC Oscillator + (BJT Amplifier + FET Amplifier for CD1 + FET Amplifier for CS2)



BECK-1000 Training contents

- 1) Diode Characteristics
- 2) Voltage rectifier
- 3) BJT Bias
- 4) BJT Amplifier
- 5) FET Bias
- 6) FET Amplification
- 7) Differentiator
- 8) Integrator
- 9) Adder
- 10) RC Oscillator
- 11) LC Oscillator
- 12) Square wave oscillator & Triangle-wave oscillator
- 13) Passive elements filter
- 14) Butterworth band-pass filter
- 15) Active element filter
- 16) Power control circuit by SCR
- 17) Mixer
- 18) Power amplifier

BECK-1000 Specifications

Div	q'ty
Diode / Constant-voltage rectifier module	2 ea
BJT Bias / Amplifier module	5 ea
FET Bias / Amplifier module	4 ea
Differentiator / Integrator / Adder module	3 ea
Oscillator module	5 ea
Filter module	3 ea
Power control module	1 ea
Mixer / Power amplifier module	2 ea
Power Supply Module	1 ea

BECK-1000 Components

Div	q'ty
Carrying box	1 EA
The finished module	25 EA
Power Supply Module	1 EA
Manual book	1 BOOK

Digital Communication Training Kit Model: DCTK-1000

NEW

DCTK-1000 Feature

1. Easy waveform observation by synchronization between informational signal and carrier required for communication experiments.
2. Easy to understand the mechanism of communication through step by step signal measurement.
3. Minimized wiring facilitates the signal measurement.
4. Modulation and demodulation is configured in a single module, facilitating understanding of the whole system.
5. Provide practice of interface between modules.
6. Useful for the training of various measuring instruments as well as understanding digital communication.

DCTK-1000 Functions

1. Provide training for various signal generators.
2. Provide training for digital coding algorithms – NRZ, RZ (unipolar, bipolar), Bipolar (AMI), Manchester code.
3. Provide training for pulse analog and digital modulation and demodulation communication – PAM, PTM, PCM, DM, ADM
4. Provide training for digital modulation and demodulation – ASK, FSK, PSK, QPSK, QAM.
5. Provide basic and advanced training for basics of phase locked loop.

DCTK-1000 Components

1) Carrying bag (casing)	1 ea
2) Module	(15 ea)
(1) Singal Generator	1 ea
(2) Line Code Encoder / Decoder	1 ea
(3) PAM Modulation and Demodulation	1 ea
(4) PTM(PPM,PWM) Modulation and Demodulation	1 ea
(5) PCM Modulation and Demodulation	1 ea
(6) DM Modulation and Demodulation	1 ea
(7) ADM Modulation and Demodulation	1 ea
(8) ASK Modulation and Demodulation	1 ea
(9) FSK Modulation and Demodulation	1 ea
(10) PSK Modulation and Demodulation	1 ea
(11) QPSK Modulation and Demodulation	2 ea
(12) QAM Modulation and Demodulation	2 ea
(13) PLL	1 ea
3) POWER SUPPLY	1 ea
4) Textbook	1 book

DCTK-1000 Specifications

Unit	Spec	Q ty
1) Signal Generator	Sign Wave	Frequency : 200Hz~320KHz
	Triangle wave	Frequency : 200Hz~200KHz
	Square wave	Frequency : 300Hz~200 KHz
	PN Code	m-sequence : 7, 15, 31 bit
	Gold Code	m-sequence : 63 bits
2) Line Code Encoder / Decoder	Unipolar and Bipolar NRZ Signal Encoder/Decoder	Type of Signal:pulse, PN code
		Data Rate:1kbps~100kbps
	Unipolar and Bipolar RZ Signal Encoder/Decoder	CLK:1kHz~200kHz
		Type of Signal:pulse, PN code
	AMI Signal Encoder/Decoder	Data Rate:1kbps~100kbps
		CLK:1kHz~200kHz
	Manchester Signal Encoder/Decoder	Type ofSignal:pulse, PN code
		DataRate:1kbps~100kbps
3) PAM Modem	Carrier Signal	1kHz~40kHz,
	Audio Signal	1kHz
4) PTM Modem	Carrier Signal	1kHz~25kHz,
	Audio Signal	1kHz~3kHz
5) PCM Modem	Built-in Sample frequency	8kHz,
	Built-in Operation Frequency	2048kHz
	Audio Signal	1kHz~4kHz
6) DM Modem	Type of Sample Signal	TTL CLK,
	Sample Frequency	8kHz~512kHz
	Audio Signal	0.5kHz~2kHz
7) ADM Modem	Type of Sample Signal	TTL CLK,
	Sample Frequency	16kHz~64kHz,
	Audio Signal	500Hz~1kHz
8) ASK Modulator	XR2206 ASK Modulator (2-ASK, 4-ASK)	Carrier Signal:16kHz
		Data Rate:1kbps~8kbps, PN code
	ASK Demodulator	Carrier Signal:16kHz,
		Data Rate:1kbps~8kbps, PN code
		Carrier Signal:16kHz
9) FSK Modulator	FSK Modulator	Data Rate:1kbps~8kbps, PN code
		Carrier Signal:4kHz, 8kHz
	FSK Demodulator	Data Rate:1kbps~2kbps, PN code
		Data Rate:1kbps~2kbps, PN code
		Carrier Signal:8kHz,
10) PSK Modulator	PSK Modulator	Data Rate:1kbps~4kbps, PN code
		Carrier Signal:8kHz
	PSK Demodulator	Data Rate:1kbps~4kbps, PN code
		Carrier Signal:20kHz
		Data Rate:1kbps~10kbps, pattern code, PN code
11) QPSK Modem	QPSK Demodulation	Carrier Signal:20kHz
		Data Rate:1kbps~10kbps, pattern code, PN code
	QAM Modem	Carrier Signal:10kHz
		Data Rate:3.3kbps, pattern code PN code
		Carrier Signal:10kHz
12) QAM Modem	QAM Demodulation	Data Rate:3.3kbps
		Carrier center frequency : 40kHz
	PLL	AC100~240V
		+12V, -12V, +5V, -5V
		Output Current
13) PLL	PLL	as per each channel - 1A
	Output	
14) POWER SUPPLY	Input	
	Output	

DCTK-1000 Contents

Chapter 1, Signal Generator : Sign wave, Triangle wave, Square wave, PN code , Gold code

Chapter 2, Line Code Encoder / Decoder : NRZ, RZ, Manchester, AMI code

Chapter 3, PAM modulation and demodulation

Chapter 4, PTM(PPM,PWM) modulation and demodulation

Chapter 5, PCM modulation and demodulation : Sampling, quantization, encoding, decoding, detection

Chapter 6, DM modulation and demodulation

Chapter 7, ADM modulation and demodulation

Chapter 8, ASK modulation and demodulation

Chapter 9, FSK modulation and demodulation

Chapter 10, PSK modulation and demodulation

Chapter 11, QPSK modulation and demodulation

Chapter 12, QAM modulation and demodulation

Chapter 13, PLL

A group of PLC Trainer PLC-1000 / FATS-5000

Factory Automation
Training System



FATS-5000

PLC Trainer



PLC-1000



PLC Training System

Model: PLC-1000

Features of PLC-1000

1. Basic PLC trainer for electric and electronic students
2. Basic PLC training and application based on wiring as needed
3. Separate PLC application modules
4. Practice of temperature control, traffic signal control, level control, conveyer control and parking control
5. Application practice using HMI
6. A slop design with 10 degrees inclined toward students, providing a convenient test environment
7. A self-diagnosis program, facilitating equipment management

Functions of PLC-1000

1. Basic understanding and practice of PLC
2. Application practice using LED Output
3. Application practice using sensors
4. Application practice using industrial instruments
5. Practice for understanding auto control mechanism
6. HMI control practice
7. Wiring as needed

Table of Contents

Part 1. PLC Control Circuit

1. Basic Understanding of PLC
2. Practice of PLC Program

Part 2. Industrial Instrument Control Circuit (including various examples)

1. Application practice using LED Output
2. Application practice using sensors
3. Application practice using models
4. Application practice using industrial instruments
5. Practice for understanding auto control mechanism

Part 3. HMI Control

1. HMI General
2. HMI Control

Part 4. Description of PLC Commands

1. Basic commands
2. Application commands

Part 5. Elements Required for System Manufacturing

1. Input elements
2. Output elements

Part 6. My Project

1. Project Format

NEW

PLC-1000 Components

Component	Qty	Component	Qty
Power- Cable	1	Wiring assemblies	300
Input & Output Unit	1	Touch Screen Module	1
PLC Download Cable	1	Textbook	1
PLC Unit	5		

PLC-1000 Specifications

Component	Specification
PLC Trainer Body	DC Output : 0 ~ 24V / 0 ~ 5A, 0 ~ 12V / 0 ~ 5A
PLC Unit	CPU
	Base
	Power Module
	Input Module
	Output Module
Input & Output Unit	Buzzer: 1 Ea
	Tower Lamp: 1 Ea
	Output Terminal : 60 Ea
	Case
Temperature Control Unit	Case: Insulated plastic injection case
	Digital temperature display
	Built-in over-heat protection device
Traffic Control Unit	Case: Insulated plastic injection case
	Practice control of various crossroad signals
Level Control Unit	Case: Insulated plastic injection case
	Enclosed water-proof structure
	Safety accident preventative structure
	Embedded controller
Conveyer Control Unit	Multi-step control (5 steps or more)
	Sample materials: 10 types or more
	Material loading to inlet (5 types or more)
	Sample material (MC or acetel)
	Conveyer driving motor (Serial roller connection)
	Conveyer belt self-aligning capability
	Various sensor covers
	Material deposit warehouse
Parting Area Control Unit	Parking capacity: 4 cars or more
	Cross bar auto up/down control with a 3-step control sensor detecting motion of model cars
	Check-in/Check-out counter and display
	Parking and full sign
Touch Screen Module	Touch Screen
	LCD : 7 inch
	Input Power : DC 24V
	Case : Aluminum case
	Front panel: Aluminum 2t
	Terminal: TOOL, USB, LAN, RS232/422/485 1 Ea
	Power : DC 24V
Available Wiring Assemblies	300 Ea

Factory Automation Training System

Model: FATS-5000

This is PLC training system having many types of portable baseboards. This system enables various application practices, which can be applied to factory automation system, by free re-deployment and by automatic detection of baseboards & their locations. This is the differentiation from existing fixed-action pattern factory automation training system.

Factory Automation Training System

FATS-5000



Contents of FATS-5000 Textbook

- Part 1. PLC overview
 - Chapter 1 Overview
 - Chapter 2 Applications
- Part 2. Basic Theory for PLC Applications
 - Chapter 3 Work Environment
 - Chapter 4 Creating a Project
 - Chapter 5 Basic Circuit, Closed Circuit, Self-Holding Circuit, Interlock Circuit
- Part 3. Learning PLC through Projects
 - Chapter 6 A-Project
 - Chapter 7 B-Project
 - Chapter 8 C-Project
- Part 4. PLC Command Description
 - Chapter 9 Basic Commands
 - Chapter 10 Application Commands
- Part 5. Elements for System Manufacturing
 - Chapter 11 Input elements, Switches, Sensors
 - Chapter 12 Output Elements, Lamps, Solenoids, Motors
- Part 6. Creating a Project
 - Chapter 13 Project form

FATS-5000 Features

1. Unlike typical factory automation training systems, it is possible to flexibly configure modules such as conveyer belt, various kinds of actuators, etc.
2. It is possible to freely move each module and to automatically identify modules and their locations on the base board
3. Both auto mode and manual mode are supported
 - Auto mode: Simple to perform programming practice as each module is connected to PLC via wiring (facilitating training as the modules are automatically recognized.)
 - Manual mode: Auto wiring is disconnected, allowing wiring practice.
4. The system is designed to allow auto test to identify system fault and missing modules.
5. Fast processing is implemented by a built-in microprocessor dedicated for operations

FATS-5000 Functions

1. Module identification and location identification
2. Debug running
 - On-line debugging can be done by setting debug run in the operation mode
3. Running various programs
 - Periodic interrupt, external interrupt and internal contact interrupt programs in addition to the scan program

FATS-5000 components

Component	Qty	Remark
Base board	1	
Conveyer belt	2	
Cylinder	1	
Turn table	1	
Feeder	1	
User's Manual	1	
Textbook	1	
CD	1	

FATS-5000 Specification

Unit	Specification	Remark
Operation Table	1000 * 440 * 750(mm) System control connector : 11ea 220V AC Power Supply, 24V DC Power Supply	
Intelligent PLC Unit	MASTER-K 2005 , MELSEC Operating Temperature : 0~55 Input : AC220V, 60Hz/DC 24V Base slot : 6ea	Selectable
Terminal Unit	I/O contact : Each 64 points 24V DC output port LED lamp Sensor and control ports : 16 points I/O contact : Each 64 points	
Mechanical		
Main Base	1000 * 750 * 10 (mm)	
Support Unit	255 * 80 * 301.1 (mm) Pneumatic cylinder : 1EA, Sensor : 1EA, Fitting : 2EA	Selectable
Conveyer Unit	300 * 137 * 173.7 (mm) DC motor : 1EA, PHOTO Sensor : 2EA	Selectable
Push Conveyer Unit	429 * 132 * 173.7 (mm) Pneumatic cylinder : 1EA, Sensor : 1EA, DC motor : 1EA, PHOTO Sensor : 1EA	Selectable
Turn Table Unit	154 * 139.2 * 163 (mm) Pneumatic cylinder : 1EA, Sensor : 1EA, DC motor : 1EA, PHOTO Sensor : 1EA	Selectable

A group of Robot Training System

MRT-1000 / RMR-1000

Embedded
Application Trainer

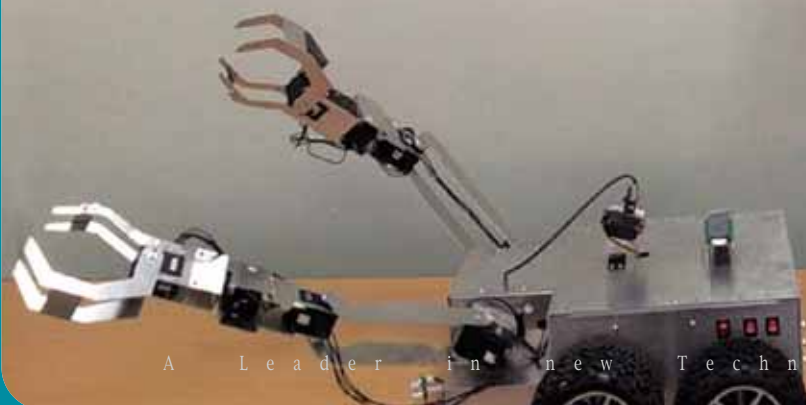


RMR-1000

Mobile Robot Trainer



MRT-1000



Moving Robot Trainer

Model: MRT-1000

NEW

Features of MRT-1000

- Composed of motor drives, which are key components of robot, and various sensor modules for collecting data
- USB communication cable with a high compatibility.
- The main board is so configured as to control 15 modules.
- On-board test pins providing various measurements using measuring instruments
- Provide a free-of-charge compiler for firmware practice
- The textbook covering theory, practice and test report to support efficient training

MRT-1000 교육내용

Part 1

- Chap 1. What is Mobile robot?
- Chap 2. Introduction of Mobile robot training equipment
- Chap 3. Introduction of LPC 1769 (Cortex M3 Core)
- Chap 4. Introduction of LPCXPRESSO
- Chap 5. Introduction of FreeRTOS

Part 2

- Chap 6. GPIO theory and practice
- Chap 7. Infrared sensor theory and practice
- Chap 8. CLCD (Character LCD) theory and practice
- Chap 9. RS-232 theory and practice
- Chap 10. Ultrasound sensor theory and control practice
- Chap 11. Analog to Digital Converter theory and practice
- Chap 12. Acceleration sensor theory and practice
- Chap 13. Angular velocity theory and practice
- Chap 14. Geomagnetic sensor theory and practice
- Chap 15. Servo motor theory and control practice
- Chap 16. DC motor & encoder theory and control practice

Part 3

- Chap 17. DRC Camera theory and control practice
- Chap 18. Image processing theory and control practice using DRC Camera

MRT-1000 Components

Component	Qty	Component	Qty
USB Cable	2EA	Adapter	1EA
Program CD(including Q&A)	1EA	Textbook	1권

Functions of MRT-1000

- Control various motors and sensors used for a robot
- Measure the operation principle of the motor and sensors using measuring instruments
- Implement various robot functions with input and output modules

MRT-1000 Specification

MCU LPC1769(Cortex-M3)		
Dot matrix	5x8 Size	Water clear type
Ultrasonic Sensor	Frequency	40KHz
	Measuring range	1 ~ 400 CM
Acceleration Sensor	Measuring range	4g
	Sensitivity	308 mV/g
	Noise	0.035deg/s/rHz
Character LCD	Size	16 x 2
RGB LED	Illuminance	650/1,300/340(mcd)
Joystick SW	5 Way SW	

Development Environment LPCXPRESSO Version 4.1.5		
DC Motor	Torque	45g/cm
	RPM	6200
Servo Motor	Torque	3kg/cm
	Speed	0.19sec/60
Angular Speed Sensor	Measuring range	300deg/s
	Sensitivity	3.33mV/deg/s
	Linearity	1%
Geomagnetic Sensor	Measuring range	360deg/s
	Resolution	1
	Interface	2-Wire synchronous serial interface
Others	IR Sensor, Slide SW, Volume, Buzzer	

Remote motion-capture robot

Model: RMR-1000

RMR-1000 Features

1. RMR-1000 provides a detailed robot control techniques through the offered control environment in which the robot moves in a same way with the detected user's movement.
2. User's arm joint motion is recognized to control robot arms. The direction of user's eyes is recognized depending on the motion of user's neck and head to enable the direction of the camera to be controlled. The camera is the eye of the robot.
3. RMR-1000 has 3 control modes like below :
 - Manual car drive mode
 - Automatic drive mode
 - Robot arm drive mode
4. RMR-1000 was developed for the motto to perform the mission in the dangerous condition that cannot be done by human or as a manless exploration robot.
So, user can experience the actual practice as well as learning the operation principles for the manless exploration robot carrying out the mission in dangerous area.

RMR-1000 Functions

1. **Manual car drive mode.**
The car moves forward, backward, to the left and to the right, depending on the direction of left hand to implement east control.
2. **Automatic drive mode.**
Using the ultrasonic sensor which is installed to the robot front side, the car can avoid the obstacles and the infrared sensor prevents falling into cliffs or fits to move for itself.
3. **Robot arm drive mode.**
By wearing the goggle, user can perform his mission of the robot arm control that senses their motion to carry out missions.

Brief operating guide manual contents (there is no training book).

1. Drive robot configuration
2. Robot power control
3. Robot arm control mode
4. Automatic drive mode
5. Manual drive mode
6. Wireless video transmission
7. Performance of mission(movement, exploration)

RMR-1000 Components

composition	item	quantity
basic component	Main board	1EA
	Robot arm board	1EA
	User arm board	1EA
	Finger key	1EA
	Robot device	1EA
	Motion suit	1EA
	Ultrasonic sensor module	2EA
	Zigbee module	4EA
	Infrared sensor module	2EA
	Dynamic cell (RX-64)	4EA
	Dynamic cell (RX-28)	6EA
	DC gear motor	4EA
	7.4V 1A lithium polymer battery	3EA
	11.1V 2.5 lithium polymer battery	3EA
	Lithium polymer battery recharger	1EA
	character LCD	1EA
option	Triaxial acceleration sensor module	2EA
	goggle	1EA
	servomotor	1EA
	Gyro sensor module	1EA
	Zigbee module	2EA
	Camera module	1EA
	Cam transceiver board	1EA
	Cam receiver board	1EA

RMR-1000 System configuration



1) Google



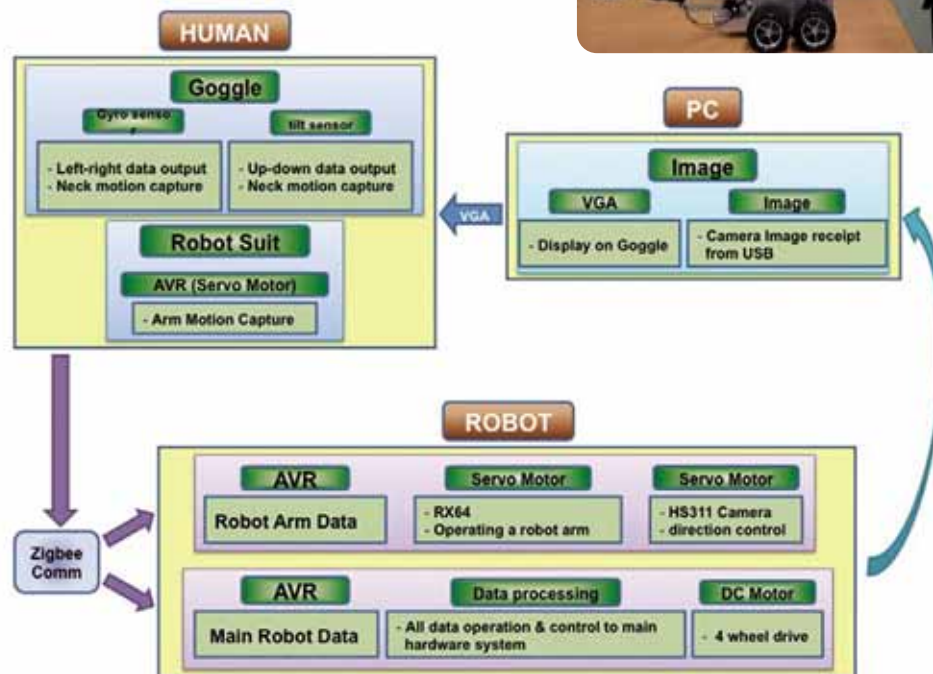
2) Suit



3) Robot car



RMR-1000 Block Diagram



RMR-1000 Specifications

Div	item	specification
robot	Robot arm	Dynamic cell (RX-64/RX-28)
		Operation voltage 12V~18.5V
		length 516mm
	Camera module	CMOS(VGA) / operation voltage 5V
	servomotor	HS-311 / operation voltage 4.8V~6V
	character LCD	16x2Lines, 85x36mm
	Ultrasonic sensor module	Operation voltage 5V / measuring distance 1cm~4m
	DC motor	Operation voltage 12V / reduction gear ratio 1/120
	Infrared sensor module	Operation voltage 5V / measuring distance 10cm~80cm
	wheel	Diameter 142mm / width 85mm
suit	car	(L)300mm / (W)420mm / (H)128mm
	suit	Dynamic cell AX-12A
		Operation volatge 9V~12V
	Triaxial acceleration sensor module	X,Y,Z direction output voltage
		Operation voltage 2.2V~3.6V
	Gyro sensor modeule	2 axis(X,Z)yaw,pitch
		Operation voltage 2.7V~3.6V
	goggles	Video input(Composite A/V)
		Video input format(NTSC / PAL / SECAM)
		resolution(920,000 Pixels Per LCD)
common	MCU	ATmega128 / operation voltage 4.5V~5.5V
	Zigbee module	Operation voltage 2.8V~3.4V
		Freq. range(2.4000~2.4835 Ghz)
	Lithium polymer battery	7.4V 1A / 11.1V 2.5A / 14.8V 4.5A

High Technology

Business History

2000.	Aug	Man & Tel Co.,Ltd established.
	Sept	Designated as Venture Company [Small and Medium Business Administration]
	Nov	Developed Mobile Telecom trainer [Patent Registration]
	Dec	Developed Filter, Divider, TAP for the use of Internet/CATV broadcast.
2001.	July	Selected as TBI (New Technology Business Institutes) [Ministry of Commerce, Industry and Energy]
	Dec	Developed Bluetooth training system [Program Registration]
2002.	Mar	Selected as the company for Technology Innovation Project from Small and Medium Business Administration
	July	Selected as INNO-BIZ company from Small and Medium Business Administration
	Nov	Developed Bluetooth Digital Wireless Headset [Patent on a new device] Excellence Award from the contest of National Business Incubator companies
	Dec	Selected as the planned company for Technology Development [Industrial Bank of Korea] Superior Technology company [Korea Credit Guarantee Fund]
2003.	Jan	Developed Wave and Antenna training system
	April	Registered Patent of Bluetooth Headset [Patent on a new device]
	May	R&D Center [Korea Industrial Technology Association]
	July	Designated as Export oriented company from Small and Medium Business Administration
	Aug	Selected as New Technology Company [Ministry of Information and Communication]
2004.	Mar	Authorized SIG Certificate for Bluetooth training system
	May	Patent for Bluetooth training system
	Aug	Technical Innovation Project Selection by Small and Medium Business Administration
	Sept	ISO-9001 Certificate (Korea Quality Assurance)
	Dec	Registered for Wave and Antenna trainer (two Patent)
2005.	Aug	Designated as Export oriented company from Small and Medium Business Administration
	Aug	Developed Ubiquitous Sensor Control trainer
	Sept	Developed Bluetooth Stereo Headset
2006.	Jan	Developed RFID trainer
	Mar	Developed Cellular Mobile trainer
	May	Developed Home Network trainer
	July	Factory registration
	Oct	NEP Certificate for Bluetooth Ear-set (NEP-2005-016(IT))
	Nov	Trademark registration for Bluetooth Ear-set [EXQ]
2007.	Mar	Established Seoul Office
	Aug	Embedded Router trainer, Authorized for Venture company (2008. 8. 28 ~ 2009. 8. 27)
	Oct	Developed Zig-bee trainer
	Nov	Developed UWB trainer
2008.	May	Developed WiMAX(IEEE802.16d) trainer
	June	Developed RFID-EPC Global trainer, Developed RFID-USN trainer
	July	Selected as INNO-BIZ company
	Dec	Selected as the company for Co-work with regional Institutes (2008.12.1~ 2009.9.30)
2009.	Feb	Selected as the company for Co-work & Customized Technology Integration and Development (2009.2.1~2010.1.31)
	April	Developed USN Training system
	July	Developed Basic embedded training system (BEET-1000 DUO)
	Aug	Developed Basic Microprocessor trainer (MBT-100)
	Sept	Developed PLD trainer (MBPT-1000)
	Oct	Developed New Antenna Training system (MATS-1000)
2010.	July	Developed Network communication trainer
	Aug	Developed 3 dimensional medical equipment
	Sep	Participated in Dae-gu EXCO medical industrial exhibition, Developed solar-energy generating trainer(SEGT-1000)
	Nov	Developed wind-power generating trainer(WEGT-1000)
2011	Mar	Manufacturing License for Medical Devices from Korean Food and Drug Administration
	Mar	Excellent ratings for Combination of medical instruments & Hand function recovery healthcare devices
	Mar	Developed PLC Trainer
	April	Purchased & moved to new company building
2012	Feb	Developed PLD Application Training system
	Mar	Developed Remote motion-capture robot
	April	Developed Basic Electronic circuit training kit



CE-WATS-2002



CE-MW-2000



CE-CMT-5000



CE-ERT-5000



CE-MT-3000



ISO-9001



Bluetooth SIG



Certificate

Man&tel

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